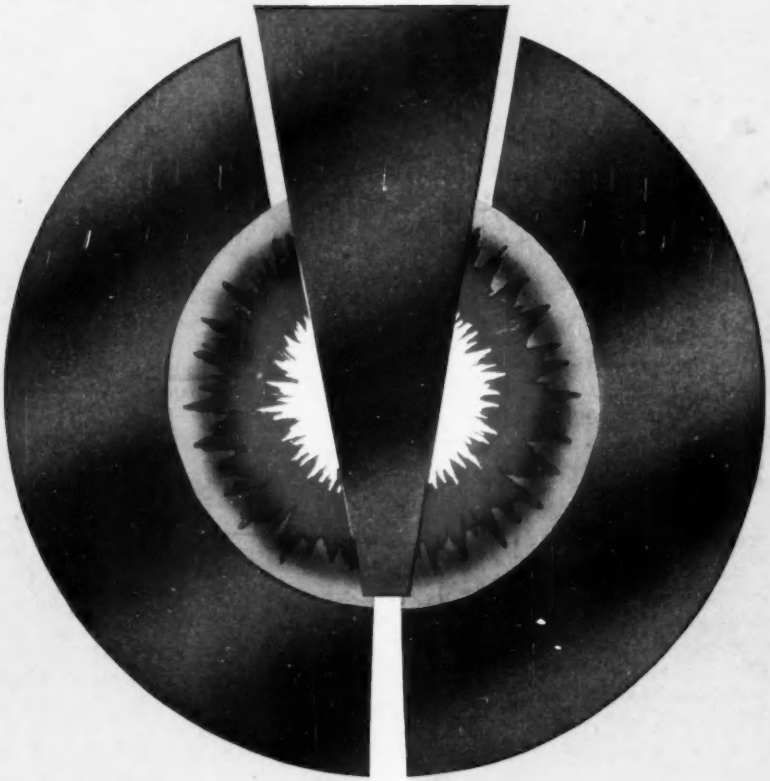
AUTOMOTIVE INDUSTRIES

JULY 15, 1949



IN THIS ISSUE

GMC Announces Its Largest Gasoline Engine
New Fire Truck with Cab Ahead of Engine
Improved Techniques Triple Dynaflow Production
Special Machine Tool Show in Vermont

Complete Table of Contents, Page 3

A CHILTON PUBLICATION

hydraulic highways...

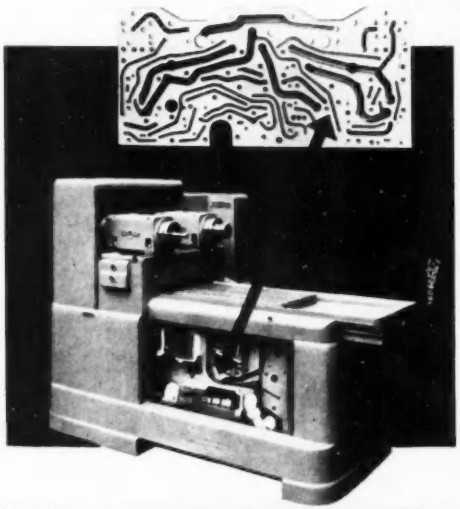
The manifold transfer plate controls flow of oil for various Heald machine cycle operations. Application of this exclusive feature eliminates yards of troublesome piping.

...that give you faster, non-stop production on the New Heald Machines

Through this intricate pattern of cored-out steel passages, flows the hydraulic fluid that controls the high-speed, automatic cycles of a Heald machine. For this is a close-up view of the Heald manifold transfer plate — an exclusive feature that provides fast, faultless control of volume and direction, without a maze of complicated, troublesome, and costly piping.

The manifold plate is universal in construction — designed to accommodate a wide variety of valve units and combinations, for any number of different machine cycle operations. And this is but one of the many new Heald features that add up to greater production, higher precision, and lower maintenance.

Your nearest Heald representative will be glad to give you the complete story — to show you how the new Heald machines can improve *your* precision finishing operations.

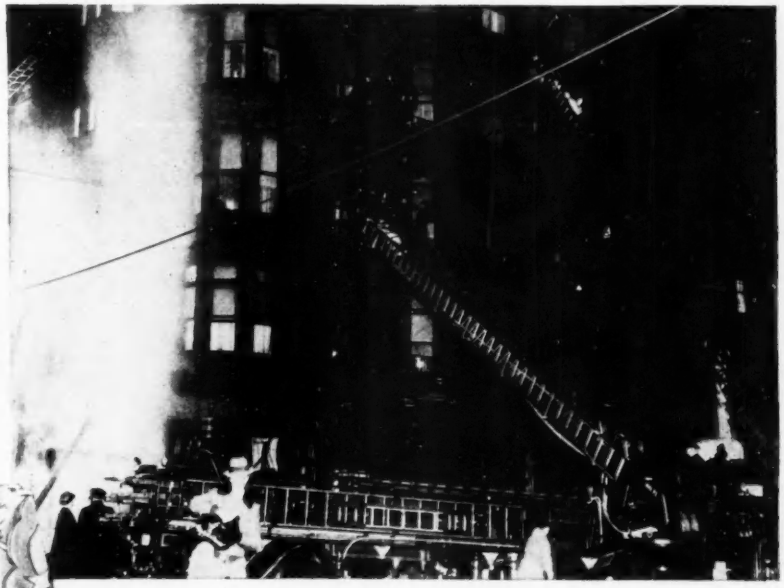


THE HEALD MACHINE COMPANY
Worcester 6, Mass.
Branch Offices in Chicago • Cleveland • Dayton • Detroit
Indianapolis • Lansing • New York

HEALD

PRECISION INTERNAL AND SURFACE GRINDERS

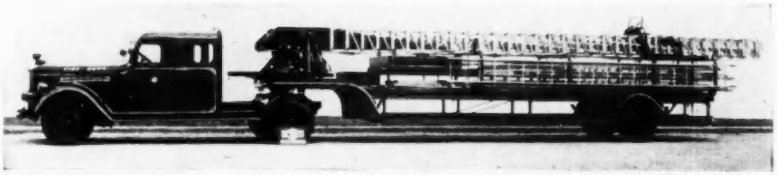
PRECISION BORE-MATIC FINISHING MACHINES



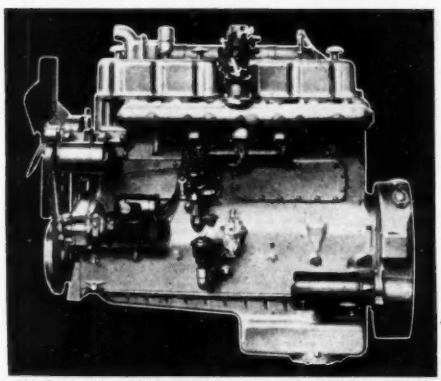
Three Pirsch Aerial Ladder Trucks powered by Waukesha Engines are shown here in action at the Martin Hotel fire, Milwaukee, Wisconsin, Feb. 23, 1948 when firemen rescued 40 to 50 guests.

Milwaukee Journal photo

...to avert disaster



WAUKESHA ENGINES



Waukesha Model 145-GKB High Output FIRE ENGINE SPECIAL
Six cylinders, 5¼" bore x 6" stroke, 779 cu. in. displ., 240 hp. at 2400 rpm.

● A major tragedy was averted at the Martin Hotel fire by the smart, fast work of Milwaukee firemen. Again high-speed, powerful Waukesha-engined fire-fighting equipment proved an important aid. Pirsch Aerial Ladder Trucks, with fast Waukesha Engines, arrived *on time* and *in time* for firemen to carry 40 to 50 guests to safety, down the trucks' ladders raised by those same Waukesha Engines. Pirsch Pumping Engines also Waukesha powered, supplied pressure for fire lines.

In the Pirsch Aerial Ladder Truck, power from its Waukesha Engine is transmitted through standard transmission and power take-off to the Pirsch-patented Hydro-Mechanical Hoist. One man completely controls all power operations—raising and lowering main ladder; extending and retracting fly ladder; 360-degree revolution of turntable in either direction.

Waukesha-powered Pirsch Ladder Trucks at this fire were of two types—4-wheel; and 6-wheel tractor-trailer type (shown separately) which has the Model 145-GKB Engine also shown. Send for Bulletin 1402.

WAUKESHA MOTOR COMPANY • WAUKESHA, WIS. • NEW YORK • TULSA • LOS ANGELES

Die Block Resharpening Time Cut in half with MATTISON GRINDER

● Grinding time for resharpening large dies has been cut in half by Allis-Chalmers Manufacturing Company through the use of their Mattison Grinder. This is true in the case of the 45″ diameter Neor hardened steel laminated blanking die shown above and also of the die shown to the right above.

The Mattison Grinder is particularly adapted for reconditioning dies of all types. Its high power and ability to hog off stock permit sharpening dies in a short time, thus eliminating costly delays and holdup of production.

Here is a great cost-reducing machine with advanced principles of design which provide precision grinding results on a high production basis whether grinding one large part or a number of small parts.

Write for free Set-Up Book, containing further examples, showing how others have reduced time and increased production with Mattison Grinders.

MATTISON MACHINE WORKS

ROCKFORD · ILLINOIS

AUTOMOTIVE INDUSTRIES

Published Semi-Monthly

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Contents

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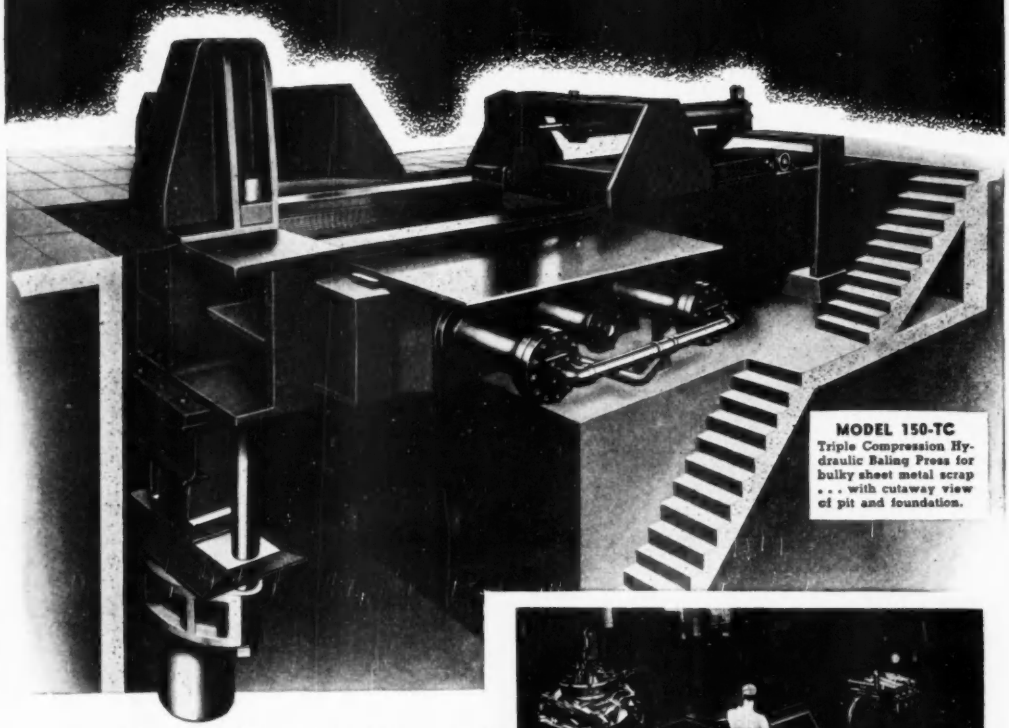
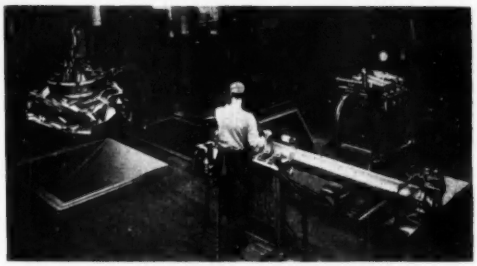
Sheet Metal SCRAP MUST Be BALED!



MODEL 150-TC
Triple Compression Hydraulic Baling Press for bulky sheet metal scrap . . . with cutaway view of pit and foundation.



Operating view of a G-H Triple Compression Baler which has served a large Eastern metal working plant profitably for many years.

Light gauge sheet metal "scrap" . . . such as industrial stampings and clippings . . . is an increasingly important factor in the production of new metal, and in the conservation of natural resources. For greatest economy and most effective utilization, it must be compressed into compact BALES of proper size and density. As such, it brings top market prices from mills, smelters, foundries.

The Hydraulic, Scrap-Metal Baling Press is necessary, profit-producing equipment in any well ordered plant where this type of scrap metal is generated in sufficient volume. Galland-Henning builds powerful, efficient hydraulic balers in a range of sizes and capacities to meet every industrial need. For Experienced Counsel on Profitable Baling of your Sheet Metal Scrap, write —

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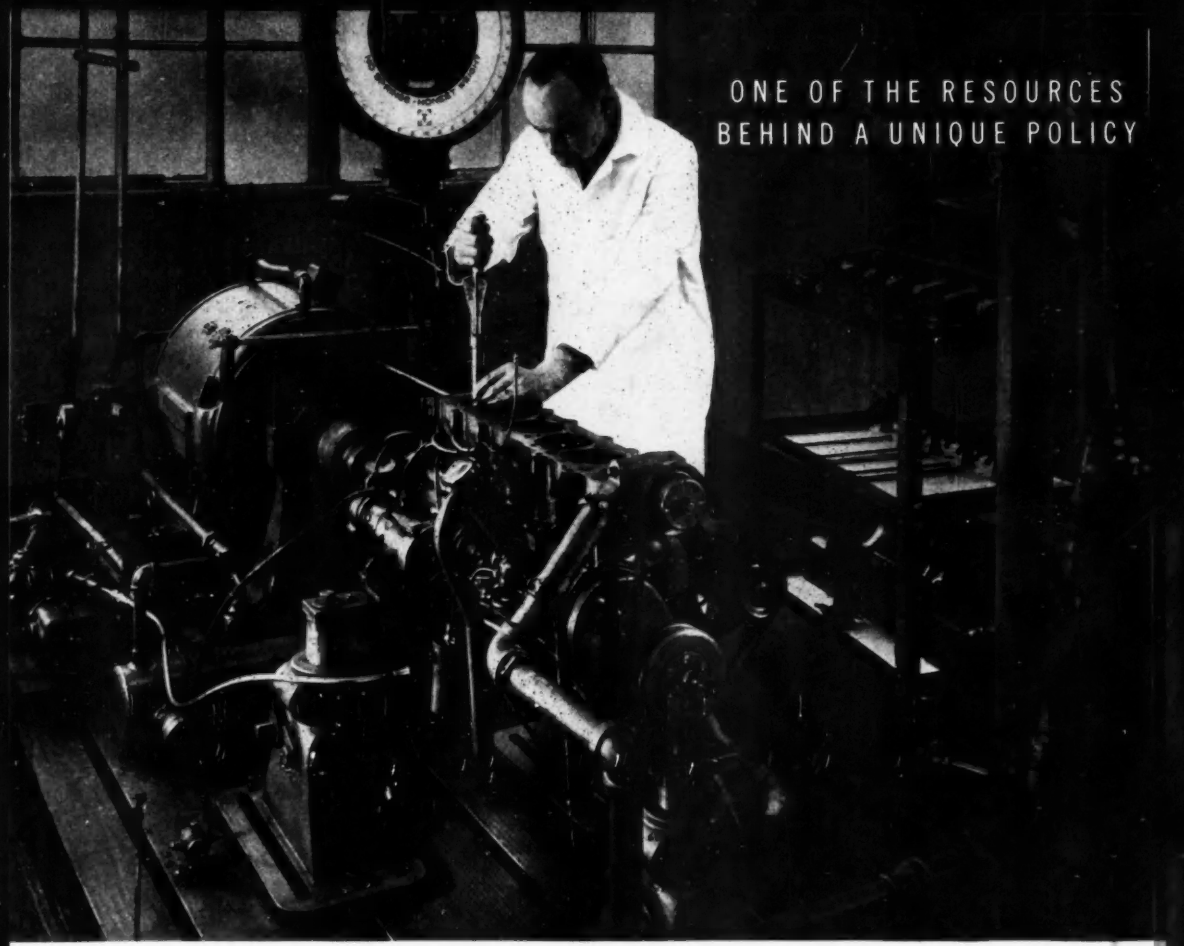
2747 SOUTH 31ST STREET • MILWAUKEE 7, WISCONSIN

GALLAND-HENNING

SCRAP METAL BALING PRESSES

A 5589-1P



IT GOES THOUSANDS OF MILES WITHOUT LEAVING THIS ROOM!

In Muskegon's Dynamometer Laboratory, above, test engines are subjected to many miles of operation to check various piston ring combinations and designs for oil economy, blow-by, and wear.

These tests often include cycling, in which the engine is gunned from idling to 3000 RPM three times a minute. The excessive heat concentrated in the pistons and rings by this type operation represents one form of accelerated and abusive testing.

Facilities for continuous dynamometer engine testing are but one of the rich resources that stands behind Muskegon's *unique policy*.

Policy

"It is Muskegon's firmly established policy to sell exclusively to manufacturers (1) for installation as original equipment and (2) for resale for service purposes."

MUSKEGON Piston Rings

MUSKEGON PISTON RING CO.
MUSKEGON, MICHIGAN
PLANTS AT MUSKEGON AND SPARTA

"THE ENGINE BUILDERS' SOURCE"

See what makes Bundyweld* better automotive tubing

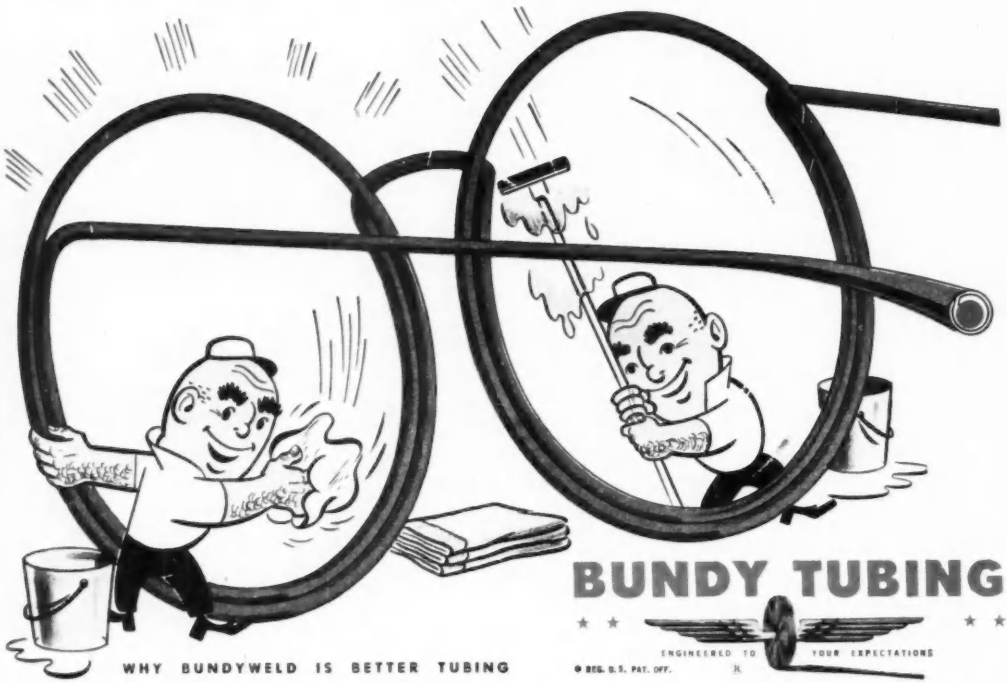
It's easy to see why Bundyweld Tubing puts other tubing out of sight when you examine its outstanding features.

For instance, Bundyweld's exclusive manufacturing operation gives you double-wall tubing *rolled from a single strip of metal*, copper-brazed through 360 degrees of wall contact. This patented Bundyweld process offers you tubing with thin yet extra-strong walls for high resistance to fatigue and continued vibration.

Bundyweld is readily fabricated, and can be easily cut, bent, or joined. Yet, with all its advantages, the cost of Bundyweld is still surprisingly low.

Hard use and abuse have proven Bundyweld's superiority for gas and oil lines, in gasoline and Diesel engines, for hydraulic brake lines in structural parts, and in any other automotive use calling for steel, Monel, or nickel tubing.

The story of how Bundyweld is made is told across the bottom of this page. For the full story, contact your nearest Bundy representative among those listed below. Or get in touch with us directly: *Bundy Tubing Company, Detroit 14, Michigan.*



WHY BUNDYWELD IS BETTER TUBING

1 Bundyweld Tubing, made by a patented process, is entirely different from any other tubing. It starts as a single strip of basic metal, coated with a bonding metal.

2 This strip is continuously rolled twice laterally into tubular form. Walls of uniform thickness and concentricity are assured by close-tolerance, cold-rolled strip.

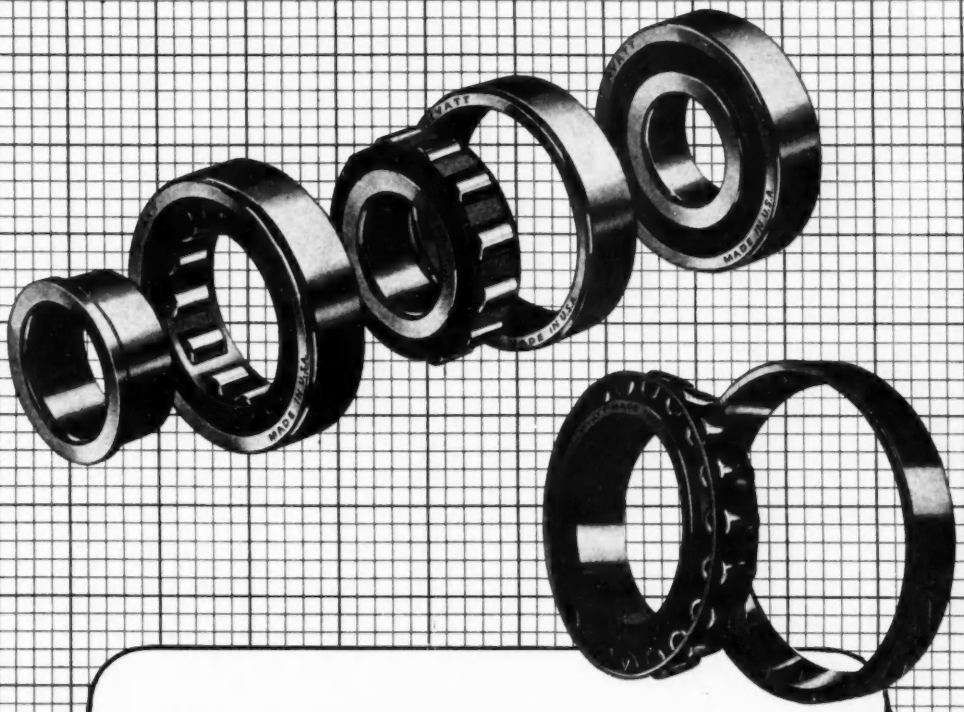
3 Next, a heating process fuses bonding metal to basic metal. Cooled, the double walls have become a strong ductile tube, free from scale, held to close dimensions.

4 Bundyweld comes in standard sizes, up to ⅝" O.D., in steel (copper or tin coated), Monel or nickel. For tubing of other sizes or metals, call or write Bundy.

BUNDY TUBING DISTRIBUTORS AND REPRESENTATIVES

Cambridge 42, Mass.: Austin-Hastings Co., Inc., 226 Binney St. • ***Chattanooga 2, Tenn.***: Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. ***Chicago 32, Ill.***: Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey***: A. B. Murray Co., Inc., Post Office Box 476 • ***Philadelphia 3, Penn.***: Rutan & Co., 404 Architects Bldg. • ***San Francisco 10, Calif.***: Pacific Metals Co., Ltd., 3100 19th St. • ***Spokane 6, Wash.***: Eagle Metals Co., E. 330 Trent Ave. • ***Toronto 5, Ontario, Canada***: Alloy Metal Sales, Ltd., 881 Bay St.

BUNDYWELD NICKEL AND MONEL TUBING IS SOLD BY DISTRIBUTORS OF NICKEL AND NICKEL ALLOYS IN PRINCIPAL CITIES.



You just can't go wrong

Hyatt has grown up with the automobile industry and earned the preference it enjoys by supplying bearings that are designed to be the best for each application.

Fully proven by performance and offering a wide range of sizes and bearing types, plus engineering service second to none, Hyatt can do a lot for you.

Hyatt Roller Bearing parts are fully interchangeable. They are available with separable inner or outer races—or as complete units—and can facilitate your assembly by eliminating selective fitting.

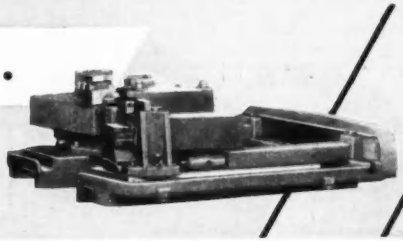
When you specify bearings for new cars, trucks or buses, insure long trouble free life for your customers and simplify your own assembly problems by designing in Hyatt Bearings. You just can't go wrong with Hyatts. Hyatt Bearings Division, General Motors Corporation, Harrison, New Jersey; Detroit, Michigan.

HYATT ROLLER BEARINGS

THE GISHOLT SIMPLIMATIC

AUTOMATIC LATHE

THIS PLATEN TABLE...



...OR THIS PLUNGE AND RADIAL HEAD

May save you the cost of a special machine... *Investigate it!*

THE SIMPLIMATIC—An automatic, single spindle, chucking lathe—adaptable to a wide variety of work that is produced in quantity.

—*with* **PLATEN TABLE** it provides a horizontal mounting using various tool slide arrangements for straight and angular turning, boring and facing cuts.

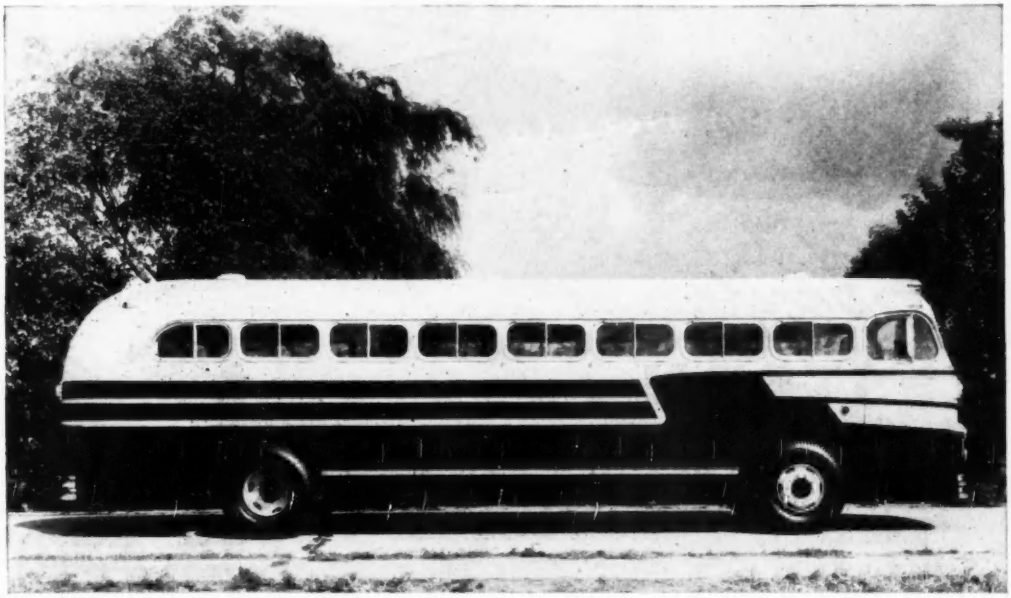
—*with* **PLUNGE AND RADIAL HEAD** it provides vertical tool mounting in front of the work with a minimum tool overhang; for combined operations on parts of large diameter with wide faces.

THE GISHOLT ROUND TABLE represents the collective experience of specialists in the machining, surface-finishing and balancing of round and partly round parts. Your problems are welcomed here.

GISHOLT MACHINE COMPANY
MADISON 10, WISCONSIN

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

Steering AT ITS BEST



GENERAL AMERICAN AEROCOACH (Model 372-M)

ROSS BRINGS EASE . . . AND ECONOMY

PASSENGER COMFORT with economy and ease of operation are outstanding characteristics of this fine 37-passenger Aerocoach, product of General American Aerocoach, East Chicago, Indiana. We take pride in the fact that among the many advantages of General American's Aerocoach, is the good steering, supplied by Ross.

The Ross policy of incorporating advancements in design as they are proved by exhaustive tests has resulted in many recent improvements. Current Ross models have:

(1) ***Increased mechanical reduction*** . . . (2) ***More compactness*** . . . (3) ***Reduction in weight*** . . . (4) ***Greater arm angular-travel*** . . . (5) ***Improved metallurgy*** . . . (6) ***Increased efficiency.***

Throughout 42 years of leadership in this industry, Ross gears have been distinguished for long life, simplicity of adjustment and maintenance of long-recognized qualities of safety, stability and performance. We invite discussion of any steering problem.

Ross

Cam & Lever **STEERING**

ROSS GEAR AND TOOL COMPANY • LAFAYETTE, INDIANA

Specify WESTERN Felt

In new designs—take advantage of Western Felt's superior qualities for many component parts. It's an extremely versatile material. Manufactured to rigid specifications.

Western Felt applications are practically unlimited—in isolating vibration, absorbing sound, filtering liquids, retaining lubricants, etc. It cuts readily to any form . . . and does not ravel, fray or lose its shape. In whatever way you may use it —Western Felt can add materially to improved performance of a product.

Name the characteristics you need . . . Western Felt engineers are ready to work with you in answering any problems that involve the possible use of felt. Write, wire or phone today.

Acadia Synthetic Division, Processors of Synthetic Rubber and Plastics: Sheets, Extrusions and Molded Parts.

WESTERN FELT WORKS

4035-4117 OGDEN AVENUE, CHICAGO 23, ILLINOIS

Branches in All Principal Cities

LARGEST INDEPENDENT MANUFACTURERS AND CUTTERS OF WOOL, HAIR AND JUTE FELTS

Bendix Products

BUILDERS OF THE BASICS OF

BETTER MOTOR VEHICLES

DEALERS AND TRUCK OPERATORS AGREE...

HYDROVAC IS FIRST CHOICE!

Everything truck operators look for in power braking, they find in greater degree and for less cost in the Bendix Hydrovac*. It gives them easier, smoother, quicker stops with less physical effort. A record number of Hydrovac installations—over 2,000,000 at present—bears out this claim. Ask the man who uses Hydrovac about its performance . . . ask the man who services it about the upkeep . . . and you'll see why Hydrovac is first choice! This preference indicates the value of including Bendix Hydrovac power braking in your original equipment specifications.

*REG. U. S. PAT. OFF.

BENDIX PRODUCTS DIVISION of
SOUTH BEND 20, INDIANA

Bendix
AVIATION CORPORATION

Export Sales: Bendix International Division, 72 Fifth Avenue, New York 11, N. Y.

BLISS Presses are in

Ford's

Past, Present and Future

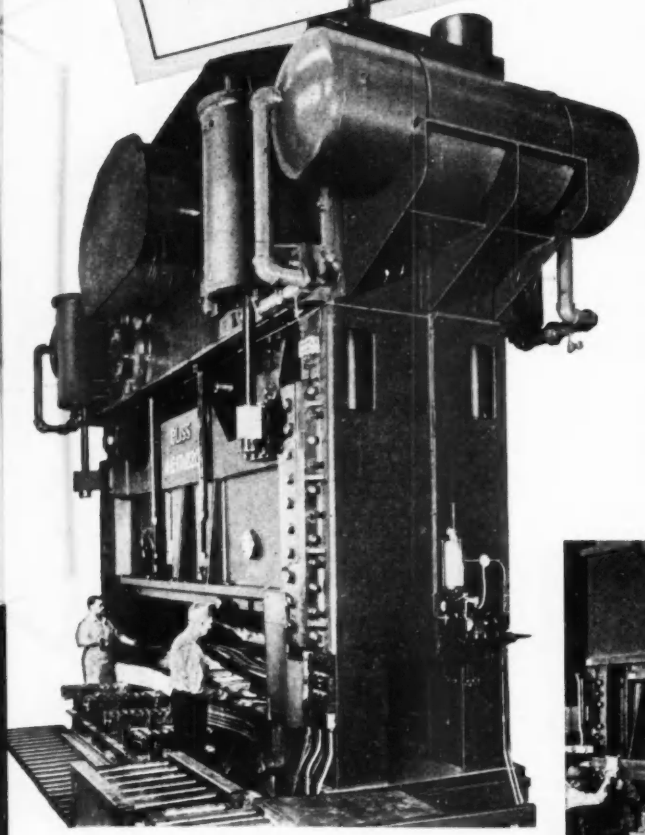
Hundreds of Bliss presses in Ford plants the country over are helping to mass-produce the thrilling new 1949 Fords, Mercurys and Lincolns. Giant forming presses are turning out body panels, and batteries of new presses, specially designed by Bliss in co-operation with Ford engineers, are stamping muffler parts, generator housings, hub caps, and hundreds of other parts.

That's how it was with the Model T and all subsequent Ford cars. Like other stampers, large and small, Ford has known for generations that "Bliss" on a press is more than a name...it's a guarantee.

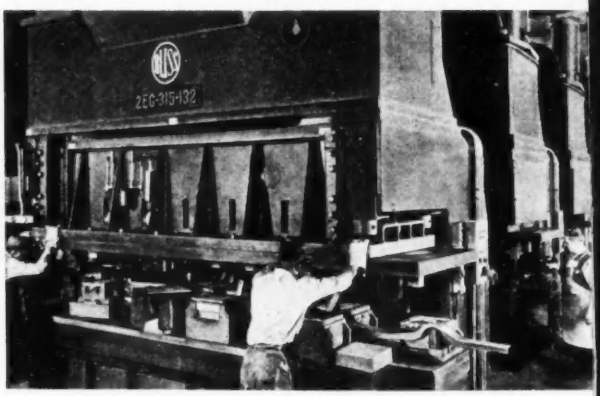
E. W. BLISS COMPANY, TOLEDO 7, OHIO

Mechanical and Hydraulic Presses, Rolling Mills, Container Machinery

WORKS AT: Toledo, Salem, Ohio; Hastings, Mich.; Derby, England; St. Ouen sur Seine, France. SALES OFFICES AT: Detroit, Mich.; New York, Rochester, N. Y.; Cleveland, Toledo, Salem, Ohio; Philadelphia, Pittsburgh, Pa.; Chicago, Ill.; New Haven, Conn.; Windsor, Ont.



Outer side rails of 1949 Fords are formed on this Bliss 2000-ton Rail Press—measuring 220" between uprights.



Battery of four Bliss Gap Double Crank Presses riveting body brackets to outer side rail.

BLISS BUILDS MORE TYPES AND SIZES OF PRESSES THAN ANY OTHER COMPANY IN THE WORLD

BLISS BUILT

Hughes-Keenan Corporation
Increases Truck Payloads 20% with J&L OTISCOLOY high-strength steel

J&L STEEL

(Above) *Spot-welding a truck roof-reinforcement and bow assembly, made of* J&L *Otiscoloy steel, at the Hughes-Keenan Corporation, Delaware, Ohio. Both the panel and bows are cold formed.* (Left) *Truck bodies on the Hughes-Keenan assembly line.*

Builds stronger, longer-lasting truck bodies with less steel

Eliminating 20% of the deadweight from milk truck bodies is not the only advantage in using J&L Otiscoloy high-strength steel, according to Hughes-Keenan Corporation, Delaware, Ohio.

For good sanitation, milk truck bodies must have their interiors steam-cleaned every day. Moisture from melting ice refrigeration during milk delivery is always present. Normally the continuous wetting and drying would cause rapid corrosion in a milk truck body made of mild steel.

Otiscoloy resists rust four to six times as effectively as mild steel. This pays off to the truck owner in longer service life. And it pays off to Hughes-Keenan Corporation in having a better quality, lighter, longer-lasting truck body.

The quality in these truck bodies does not entail added production costs. Although high-strength steel is more expensive than mild steel, Otiscoloy is used two gauges lighter with equal or greater strength than ordinary mild steel. Four sections can be made from Otiscoloy where only three sections of equivalent strength could be made from the same weight of mild steel. More units are produced per ton, freight costs are reduced, units are lighter, easier to handle during production.

Otiscoloy is recommended for applications where strength without bulky weight is desired—also where corrosion, abrasion and fatigue are problems in the service life of equipment.

Otiscoloy can be formed hot or cold, welded, forged, flame-cut and otherwise worked by standard methods. Here is a *modern* steel that is worth *your* investigation. Why not return the coupon to us today?

Jones & Laughlin Steel Corporation
430 Jones & Laughlin Building
Pittsburgh 19, Pa.

Please send me at once a copy of your booklet, "Otiscoloy High-Tensile Steel."

NAME_____

TITLE_____

COMPANY_____

ADDRESS_____

JONES & LAUGHLIN STEEL CORPORATION

From its own raw materials, J&L *manufactures a full line of carbon steel products, as well as certain products in* OTISCOLOY *and* JALLOY *(hi-tensile steels).*

PRINCIPAL PRODUCTS: HOT ROLLED AND COLD FINISHED BARS AND SHAPES • STRUCTURAL SHAPES • HOT AND COLD ROLLED STRIP AND SHEETS • TUBULAR, WIRE AND TIN MILL PRODUCTS • "PRECISIONBILT" WIRE ROPE • COAL CHEMICALS

AUTOMOTIVE INDUSTRIES

The Authoritative Technical and News Magazine That Gives Comprehensive Coverage, Domestic and Foreign, of These Industries:

Passenger Car	Engine	Parts and Components
Truck	Body	Accessory
Bus	Trailer	Production Equipment
Aircraft	Road Machinery	Service Equipment
Tractor	Farm Machinery	Maintenance Equipment

High Spots of This Issue

The Motor Vehicle Vacuum in Spain

Through its National Institute of Industry (INI) the Spanish Government has stifled revitalization of the automobile industry and the motor transport system in that country. Its apparent policy of controlling all new automobile developments in Spain has even prevented big concerns like Ford and General Motors from major scale operations there. Interesting, enlightening survey on the subject starts on page 25.

Buick's Tripled Dynaflow Production

Addition of thousands of feet of monorail conveyors, changes in assembly lines, and increase in the number of test machines are among many improvements at Buick since initial set-up for the production of Dynaflow transmissions in early '48. For an up-to-date picture of present techniques now tripling Buick Dynaflow production, turn to page 26.

GMC Announces Its Largest Gasoline Engine

With introduction of the postwar GMC heavy duty truck line, General Motors has added their GMC Model 707 gasoline engine. This six-cylinder, valve-in-head powerplant, with piston displacement of 707 cu. in., develops 225 gross bhp at a governed speed of 2200 rpm. Major specifications and cross sectional drawings augment this article, beginning page 30.

Vermont Machine Tool Builders Hold Plant Exhibits

Four well-known New England manufacturers sponsored a special machine tool show at their own plants in the Springfield-Windsor area of Vermont, week of June 20. Sponsors were Jones & Lamson Machine Co., Fellows Gear Shaper Co., Bryant Chucking Grinder Co., and Cone Automatic Machine Co. The full account, describing performance of the new equipment shown, commences on page 34.

High Compression Without High Octane Fuel—Part II

Part II of this four-part article analyzes costs of equipment required to produce various types of fuel, including fuel made from coal. It also discusses part-throttle fuel consumption, the use and value of dual-fuels, and methods of securing better mileage from fuels of the present-day. Page 36.

22 New Product Items And Other High Spots, Such As:

The large attendance at the National Truck-Trailer Show, Los Angeles; new fire-fighting apparatus featuring cab-ahead-of-engine; high speed automatic broaching of automobile window regulator crankshaft splines; a special machine for drilling and tapping cross members; and an aluminum piston with iron ring lands.

News of the Automotive Industries, Page 17
For Complete Table of Contents, See Page 3

How to streamline Your Steel Inventory

During the past period, steel users naturally have been most interested in getting the steel they needed without too much emphasis on quality. Inventories were built up as much as possible because of excessive demand and uncertain supply.

Now, the time has come when industry can begin to streamline inventories and can place more emphasis on quality. While a few products remain on the critical list, a balance between supply and demand has been reached for most steels. Under these conditions, yesterday's "normal" inventory may loom large and steels of doubtful ancestry may prove a liability.

We are glad to be in a position again to recommend that you keep your inventory at a practical working level and use our warehouse stocks as your inventory reserve. The many Ryerson Steel-Service Plants throughout the country are particularly well equipped to help you keep your inventory streamlined. Carbon, alloy and stainless steels in thousands of analyses, shapes and sizes are ready for quick shipment—and their uniform high quality is assured by our Ryerson Certified Steel Plan.

So don't let changes in market conditions or product design catch you with high inventories. As warehouse stocks improve we suggest that you extend a conservative buying policy over an increasing range of your steel requirements and keep in touch with us for your current needs.

PRINCIPAL PRODUCTS

BARS—carbon & alloy, hot rolled & cold finished
SHAFTING—cold finished, ground & polished, etc.
STRUCTURALS—channels, angles, beams, etc.
PLATES—sheared & U. M., Inland 4-Way Floor Plate
SHEETS—hot & cold rolled, many types & coatings
TUBING—seamless & welded, mechanical & boiler tubes
STAINLESS—Allegheny bars, plates, sheets, etc.
REINFORCING—bars and accessories
MACHINERY & TOOLS—for metal fabrication

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • PHILADELPHIA • DETROIT • CINCINNATI
CLEVELAND • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO

NEWS *of the* AUTOMOTIVE INDUSTRIES

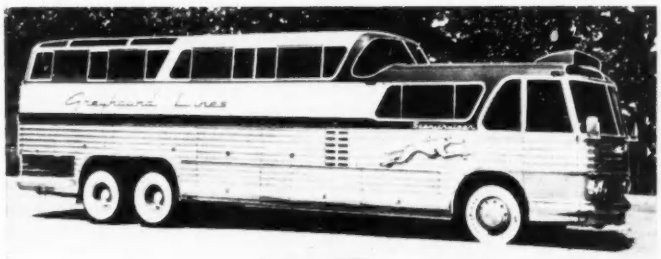
Vol. 101, No. 2 **July 15, 1949**

GM Hits All-Time Record Output in June

Recording the highest monthly production in its history, GM built 275,703 passenger cars and trucks in the U. S. and Canada in June. May's output of 265,280 cars and trucks, the previous high GM monthly production record, was topped by 10,423 units. June production included 229,564 passenger cars and 46,139 trucks. For the year to date, GM has built 1,363,038 passenger cars and trucks in the U. S. and Canada, compared with 1,062,359 for the same period last year.

K-F May Build Many Small Assembly Plants in U. S.

If experimental plants now being built in Los Angeles and Portland, Ore., are successful, Edgar F. Kaiser, K-F president, states that the company is planning to build many small final assembly plants throughout the U. S. Each capable of producing 20 automobiles a day, the plants would be an experiment in labor relations, according to Mr. Kaiser who says that it is his theory that better labor relations can be obtained with decentralization. He went on to point out that management can thus establish closer personal contacts with workers than is possible in a large plant.



Acme

GLASSY HOUND

Now beginning test runs, the Greyhound Lines' 43-passenger "Scenicruiser" has a 10-passenger forward deck, and a 33-passenger rear level. The air-conditioned bus was built by Greyhound engineers with the aid of GM's styling section and Raymond Loewy Associates. Powered by a 220-hp diesel engine, it is 40 ft long.

Ford Buys 100 Acres Near Buffalo for Expansion

A 100-acre site near Buffalo, N. Y., has been bought by the Ford Motor Co. for future expansion. Located in the town of Hamburg, N. Y., the land is about a mile from Ford's assembly plant in Buffalo, and may possibly be used as the site of a pressed steel plant to make passenger car sub-assemblies and stampings.

June Car and Truck Output Close to Record

Automobile and truck production in U. S. and Canadian plants during June amounted to 631,308 units and came close to the all-time record of 663,811 vehicles built in April, 1929. Cars and trucks built in the U. S. totaled 599,811 units in June. According to present predictions, July production will be even higher than in June and an all-time record will be established during August.

Top GM Vice President To Retire in Fall

Ormond E. Hunt, executive vice-president, General Motors Corp., is going to retire this fall according to a reliable source.

Nash and Hudson Developing Small Cars

Both Nash and Hudson have smaller cars under development and, in fact, have even made initial preparatory moves to getting them into production. It is not certain, however, that the cars will be built since it has been the experience of the industry that sometimes plans are changed suddenly in view of economic developments. According to the best information, neither company is shooting for a $1000 car, but rather for a smaller and lower priced model than those now in the line. There is still no signs that any of the Big Three are contemplating a lower priced small automobile such as Chevrolet had in mind a couple of years ago, but which was abandoned.

Name Keating General Manager of Chevrolet

GM has announced that Thomas H. Keating has been named general manager of the Chevrolet Motor Div., succeeding W. F. Armstrong, who has been granted a leave of absence because of illness. A member of the Chevrolet organization since 1916, Mr. Keating has been general sales manager of Chevrolet since Oct. 15, 1945.

Army Announces $65 Million in Automotive Contracts

Contracts totaling $65,418,010 in trucks and automotive parts and products have been announced by the Army Dept. However, less than half the total dollar value was expended for equipment for military use, the remainder being for other government agencies and aid to Greece, Turkey and the ECA. The contracts were as follows: Reo Motors, for 4970 2½-ton trucks, tooling and parts, $31,768,013; Chrysler Corp., 2428 ¾-ton trucks and parts, $14,243,501, and 1481 ½-ton trucks, $1,470,025; Willys - Overland Motors, for 4573 ¼-ton trucks and parts, $12,464,013; General Motors, four five-ton carriers, $1,325,533; Highway Trailer Co., 90 2½-ton trucks, $409,432; International Harvester Co., 407 trucks and parts, $1,136,683; Continental Motors Corp., 10 engines, $217,850; Maremont Automotive Products, spare parts, $186,750; Price Battery Corp., 6000 storage batteries, $107,400; Century Tool Co., tool equipment, $252,450; Manufacturers Battery Co., 25,000 batteries, $151,725; American Brake Shoe Co., 1296 tools and

FOLD DOWN FOR EIGHT

Now in production, the De Soto Carry-All four-door sedan shown here has a rear seat which can be folded down to the floor, providing nearly eight ft of cargo space from the back of the front seat to the rear deck lid.

equipment, $249,895; Maremont Automotive Products, 28,720 spare parts, $186,750; Gar Wood Industries, 94 bulldozer and spare parts, $277,012; D. W. Onan and Sons, 625 battery chargers, $309,331; Universal Prods. Co., 24,400 automobile parts, $440,345; Sid's Truck & Auto Sales, 1791 automobile parts, $113,457; and Federal Motor Truck Co., 18 10-ton trucks, $107,845.

Playboy Spent $1.7 Million in "Preproduction"

The Playboy Motor Corp. of Buffalo spent $1,793,331 in its efforts to develop the small automobile it once dreamed of turning out at the rate of 100,000 a year. This was shown in a company balance sheet on file in Federal Court. The expenses piled up in nearly two years of "preproduction," which failed to mature to production. Playboy's "preproduction" expenses included costs of painstaking engineering and testing, materials, wages and salaries, and occupancy and maintenance of the huge wartime plant in Buffalo which the company intended to buy from the Government.

It was expenditures for things like this that swallowed up the money that poured in from people who bought franchises to act as distributors and dealers. Altogether net proceeds from sale of franchises came to $2,093,636. On top of such "preproduction" costs were bills of $116,579 for machinery and equipment; $90,241 for tools and dies; and $10,741 for office furniture and fixtures, the balance sheet showed. There are literally rooms full of blueprints, down to the last nut and bolt of the Playboy car, to show for two years of engineering work. The company built 97 cars, experimentally or for demonstration purposes, and there was no other production.

Name Deo Managing Director of NADA

Succeeding Robert W. Kneebone, Robert Deo, who has been general counsel, has been selected unanimously as managing director of the National Automobile Dealers' Association. A native of Michigan, Mr. Deo was graduated from both the University of Michigan and the Michigan Law School. During the war he was Regional Attorney for the Office of Defense Transportation in Philadelphia, and was serving in that capacity when he joined the staff of NADA.

To Hold Hearings on Wages in Aircraft Industries

An important hearing effecting minimum wages in the aircraft parts industry will be held in Washington July 26, according to the Automotive & Aviation Parts Mfrs., Inc. The Wage and Hour and Public Contracts divisions of the Department of Labor will conduct hearings on redetermining the prevailing minimum wage in the aircraft parts, airframe, engine, and propeller industries. Currently, the minimum rate is 50 cents, and it is believed that a much higher rate may be set as a result of the hearings. Manufacturers who would be affected adversely by a much higher minimum rate are urged by AAPM to appear at the hearing and oppose such a determination. Another important matter to be taken up at the hearings is the possible changing of the proposed definition of the "aircraft manufacturing industry."

Continental Motors Earns $1.3 Million in Half Year

Continental Motors Corp. and consolidated subsidiaries had net earnings of $1,319,414 for the six months ended April 30, 1949, as compared with $1,724,411 in the same period last year. Sales for the six months this year were $43,650,002 as compared with $57,054,547 a year ago.

Lincoln-Mercury Regroups Sales Districts

Grouping its 21 sales districts into four regions, Ford's Lincoln-Mercury Div. will effect a closer tie-in with dealers, the district offices and the factory, according to Joseph E. Bayne, general sales manager. The Western Region will have headquarters at the Los Angeles Lincoln-Mercury plant; the Midwest Region will be located in Chicago; the Central Region in Detroit; and the Eastern Region in New York. Henry B. Daniels has been appointed Western Region Sales Manager. Robert F. Williams has been named Manager of the seven-district Midwest Sales Region. Managers for the other regions will be appointed later.

Rootes to Sell in U. S. on Long-Term Basis

Rootes group cars and trucks including the Hillman are in the American market on a long term basis, Sir William Rootes stated in London, recently. He said that "figures of cars exported to the U. S. are somewhat deceptive because of the stocks which British automobile makers had built up abroad.

"In time of inflation," he continued, "with people rushing to buy before prices advance, it is human nature to overdo the matter of optimism. So in times of disinflation it is the tendency to overdo the matter of pessimism. Speaking for the Rootes group, we haven't the sligtest idea of dropping out of the U. S. market. We are appointing more dealers each week and are now in a position to service our cars on a widespread basis in the United States. When we first entered this market we did so with a long range plan in mind and our plans haven't changed in the slightest degree.

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"It isn't a question of competition with American cars, but simply that of giving those American families who want smaller, more economical cars, a product that meets their needs. The few thousand cars we have sent to the U. S. aren't a drop in a bucket compared to the hundreds of thousands of American cars produced."

Entirely New Singer for Export

The valve arrangement of the new Singer S.M. 1500, consists of two rows of inclined valves, operated by rockers, with a central camshaft between them. The camshaft is driven by duplex roller chain, provision being made for the sprocket to be uncoupled from the end of the shaft when the detachable head has to be removed. The cylinders and crankcase are cast integral, and there are three interchangeable main bearings. The counterweighted crankshaft is of Meehanite. Pistons are light alloy, split skirt type, with one scraper and two compression rings. Power output is stated to be 48 hp at 4500 rpm, with a compression ratio of 7 to 1, and maximum torque is 76 lb-ft at 2600 rpm. The engine mounting is by the Metalastic floating three-point system. Clutch is a Borg & Berg eight-in. model. The four-speed transmission provides synchromesh on second, third and fourth, the gear shift lever being under the steering wheel. The forward sliding joint of the propeller shaft is within an extension of the gearbox, allowing the shaft to have uniform joints front and rear. Hypoid gears are used in the rear axle.

The new front wheel suspension is of the coil spring type with upper and lower support arms, the lower member having a very wide supporting base on a frame-cross member at the front and on the chassis side rails at the rear. Metalastic moulded rubber bushings are used at all anchorage points. Air conditioning is an integral part of the new car, consisting of a hot water element, through which air, drawn through flexible ducting from the front grille, is forced by a fan. When desired, the hot water can be shut off and cool air circulated. The complete weight is stated to be 2520 lb, with five wheels and 16 x 5.50 tires. Overall length is 174 in., with an overall width of 63 in. and height of 64 in.

Wide World

SPORTING, WHAT!

Designed for racing and sports by Curt Delfonsse, engineer of Dusseldorf, Germany, this streamlined Volkswagen, is said to have a top speed of 80 mph. The designer says that he can step the speed up another 20 mph and still hold gasoline economy to 24 mpg.

K-F Security Benefits Hit $1 Million Yearly Rate

Over $1 million a year in benefits are now being received by employees of the Kaiser-Frazer Corp. under the security program, trustees of the K-F UAW-CIO Social Security Fund and the K-F Social Security Fund disclosed recently. About 82 per cent of the workers in the Willow Run, Detroit Engine Div., Dowagiac and Adrian plants are covered by the K-F UAW-CIO Social Security Fund, which is administered jointly by trustees appointed by the company and the union. Other eligible employees participate under a separate plan administered by the company alone, identified as the K-F Social Security Fund.

EARMARKED SINGER

The model S.M. 1500, produced by the Singer Co., Coventry, England, is earmarked for export only. Entirely new throughout, it is a six-passenger four-door sedan on a wheelbase of 107½ in., powered by a four-cyl overhead-valve, overhead-camshaft engine of 91.8 cu in. piston displacement. It features independent front-wheel suspension, semi-elliptic rear springs, a four-speed transmission and an all-steel body.

Nash Spends $54 Million on Postwar Modernization

In a letter to stockholders, George W. Mason, president, Nash-Kelvinator Corp., said that by Sept. 30, the end of the present fiscal year, the company will have spent $54 million on its postwar expansion and modernization program. Covering the 1946-49 fiscal years, he stated that this amount includes $15 million being spent for this purpose in the current year. The program will be completed in 1950 with a smaller expenditure.

Mexico Reduces Car Output of U. S.-Owned Plants

The government of Mexico has ordered a 43 per cent reduction in automobile production by American-owned plants for the year beginning July 1. It is estimated that the curtailment will save Mexico approximately $15 million during the next year. Under the cur-

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RECORD BREAKER

The small Lambretta motorcycle, shown here, produced by the Innocenti Co. of Italy, recently completed an endurance run of 5000 km, reportedly breaking the world's record.

tailment program, 15,900 cars and trucks may be built, compared with 29,000 last year. At least half the production of automobiles must be in the cheapest price class of each manufacturer. Importation of built up cars and trucks into Mexico is forbidden.

Buick Now Producing Riviera

First shown at the GM show in New York City last January, Buick's Riviera model is now in production. Resembling a convertible in appearance, the Riviera (shown in the Dec. 15, 1948 AUTOMOTIVE INDUSTRIES on page 19), has an all-steel permanent top.

Turbo Products Opens New Plant

Turbo Products, Inc., has opened a plant in Los Angeles for the production of gas turbine components for aircraft engine manufacturers. The firm is also developing a hollow blade to be used in conjunction with air or fluid cooling. Leon Kaplan is president, Maurice Commanday, secretary, and Jack Sinder, treasurer.

Motorists Paid Record Taxes in 1948

The Public Roads Administration reports that the motor vehicle owners of the U. S. paid the largest special tax bill in history last year. About $3272 million was paid in special automotive taxes to the states and the Federal Government in 1948, which is more than 13 per cent higher than in 1947. An all-time high was also hit on a per vehicle basis in the amount of special state and federal taxes paid by the average motor vehicle owner—$81, compared with about $77 in the previous year, and $51 per vehicle about ten years ago.

1949 MOTOR VEHICLE FACTORY SALES FROM U. S. PLANTS*

	Passenger Cars	Trucks	Buses	Totals 1949	Totals 1948
January	326,019	104,599	658	431,276	405,663
February	324,547	101,700	418	426,665	383,002
March	402,402	115,171	545	518,118	492,034
April	436,392	106,212	514	543,118	438,090
May	394,703	86,200	564	481,467	338,538
Total	1,884,063	513,882	2,699	2,400,644	2,057,327

1949 FACTORY SALES TO DOMESTIC AND FOREIGN MARKETS *

	Passenger Cars		Trucks		Buses	
	Domestic	Foreign	Domestic	Foreign	Domestic	Foreign
January	312,199	13,820	91,282	13,317	618	40
February	310,343	14,204	88,540	13,160	326	92
March	385,834	16,568	99,925	15,246	423	122
April	422,149	14,243	91,808	14,404	494	20
May	380,489	14,214	75,518	10,682	511	53
Total	1,811,014	73,049	447,073	66,809	2,372	327

* Automobile Manufacturers Association.

Nash to Open Toronto Plant in Early 1950

The formal opening of the Nash Motors' plant at Toronto, Canada, is scheduled for early 1950, according to George W. Mason, president, of both Nash Motors of Canada, Ltd., and Nash-Kelvinator Corp. of U. S. Mr. Mason disclosed that Thomas S. Adams has been named manager of the new Toronto plant.

Ferrari Wins First Postwar 24-Hr Race in France

In a first postwar 24-hr race at Le Mans, France, a 12-cyl 122 cu in. Ferrari, driven by Luigi Chinetti and Lord Selsdon, covered a distance of 1973.3 mi, averaging 82.26 mph for the two rounds of the clock. The race was for cars coming under the loose European definition of stock models, which includes everything on sale to the public. While only sports cars have any reasonable chance, the rules impose minimum body dimensions, the use of standard gas, full equipment, and no spares or tires other than those on the car at the start.

Ford Hourly Rate Double That in 1939

John S. Bugas, Ford vice president, has revealed some interesting figures in a letter to the UAW-CIO in connection with current contract negotiations. He points out that in April of his year, the Ford average hourly rate stood at $1.66, compared with 90 cents in 1939. He adds, however, that about 18½ cents an hour must be added for other direct, and indirect "hidden payroll" benefits, and, in addition, an extra 7½ cents hourly must be included for overtime and shift premiums, adding up to an average true per hour labor cost of approximately $1.92, or considerably more than double the 1939 average.

Curtiss-Wright Coordinates Manufacturing Under Earle

In accordance with management reorganization plans, Paul Shields, chairman, Curtiss-Wright Corp., has announced that the company's three aircraft manufacturing divisions are being coordinated under the executive direction of Robert L. Earle who has been elected senior vice president of the corporation in charge of its aeronautical operations. Theodore B. Focke, general manager of the airplane division, of Columbus, O., has been named vice president and general manager as

well as a director of the Wright Aeronautical Corp. Succeeding Mr. Focke, H. Fletcher Brown, factory manager of the airplane division, has been named general manager of that division. Maj. Gen. Edward M. Powers, USAF (ret.) has been appointed vice president and director of engineering.

Nash Motors to Get GM Hydra-Matic

Nash Motors has reached an agreement with General Motors for the use of GM's Hydra-Matic automatic transmission according to information from an authoritative source. However, Nash officials are not ready to comment about it at this time.

British Firm Developing Gas Turbine for Car

Now in the preliminary experimental stage, designs for gas turbine driven automobiles are being developed by the Armstrong Siddeley company of England. The design is said to feature a pneumatic transmission system.

Ethyl Ups Octane Rating

The Ethyl Corp. has boosted the required antiknock rating for all gasoline sold under the "Ethyl" trademark to 86 octane number by the Research test method. H. W. Kaley, Ethyl vice president, said that Sept. 20 was legal requirement according to agreement, and that actually most of the 189 oil companies using the trademark are already meeting these new specifications as result of recent improvements in quality of premium gasoline.

GM Buys Flint War Plant for $2.4 Million

War Assets, General Services Administration, has approved the sale of a government-owned plant at Flint (Grand Blanc), Mich., to GM for $2,404,456. Along with the plant, which manufactured tanks during the last war, GM acquired $129,330 in personal property.

Machine Tool Conferences in Sales Engineering

Special conferences in sales engineering designed for the machine tool industry are being held by Cornell, Dartmouth, Western Reserve, and Purdue universities. Arranged in cooperation between the National Machine Tool Builders' Association and the American Machine Tool Distributors' Association and the universities, the conferences will be open to employees of members of these associations. The conferences are scheduled as follows: Cornell University, Ithaca, N. Y., July 11 to 16; Western Reserve University, Cleveland, O., July 25 to 30; Dartmouth College, Hanover, N. H., August 8 to 13; and Purdue University, Lafayette, Ind., August 15 to 20.

Oldsmobile Makes Changes in Executive Staff

G. R. Jones, who has been employed by Oldsmobile in important sales posts on the Pacific Coast since 1933, has been made general sales manager, succeeding D. E. Ralston, who has been named executive assistant to the general manager, according to S. E. Skinner, GM vice-president and general manager of the Oldsmobile Div.

Elect Charles T. Fisher, Jr. to Fisher Board

Charles T. Fisher, Jr., has been elected a director of Fisher & Co., according to Charles T. Fisher, company president. Charles T. Fisher, Jr., is president of the National Bank of Detroit, and a director of Briggs Manufacturing Co., American Airlines, and the Detroit Edison Co.

Ward LaFrance Builds Giant Tractor

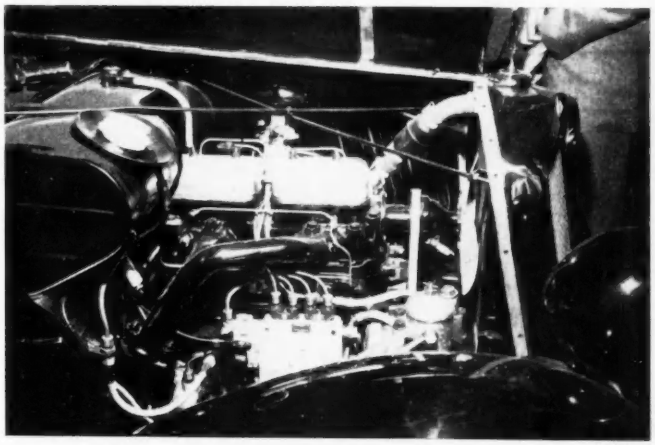
A 275-hp tractor, said to be one of the biggest vehicles of its kind ever built, has rolled off the assembly line at the Ward LaFrance plant in Elmira, N. Y. for delivery to South Africa. The nine-ton, Diesel-powered giant will haul loads of 50 tons or so up mountainous roads on Africa's east coast. The tractor has two transmissions with a selection of 15 speeds. It can travel at better than 50 mph on the level or throttle down to less than a mile an hour on hills.

Kessinger Head Advertising for Dodge Trucks

E. C. Quinn, general sales manager, Dodge Div., Chrysler Corp., has announced the appointment of W. L. Kessinger as truck advertising manager. Mr. Kessinger joined Graham Brothers, Inc., in 1918, when that company was with Dodge. He was Dodge service promotion manager from 1935 to 1943, and has been devoting his time exclusively since 1945 to truck promotion and advertising.

Seiberling Creates New Passenger Tire Dept.

The Seiberling Rubber Co. has created a new passenger tire department



Wide World

BARE AT THE FAIR

Featured at the recent trade fair in Hanover, Germany, this Diesel engine, developing 38 hp, was installed in a new Mercedes-Benz automobile. The car reportedly has a speed of approximately 60 mph.

NEWS *of the* AUTOMOTIVE INDUSTRIES

NEW PASSENGER CAR REGISTRATIONS

Arranged by Makes in Descending Order According to the Four Months' Totals

MAKE	April 1949	March 1949	April 1948	FOUR MONTHS Units 1949	Units 1948	Per Cent of Total 1949	Per Cent of Total 1948
Ford	67,212	69,858	23,864	245,043	153,815	19.11	13.18
Chevrolet	76,637	71,389	71,184	219,473	246,150	17.11	21.09
Plymouth	49,473	29,064	35,598	135,734	116,706	10.59	10.00
Buick	28,666	29,885	24,823	109,524	87,623	8.54	7.51
Pontiac	24,672	25,898	24,187	77,789	82,233	6.06	7.05
Oldsmobile	20,325	20,733	19,197	70,878	62,206	5.52	5.33
Dodge	14,585	15,679	24,332	63,641	77,746	4.96	6.66
Studebaker	16,087	14,389	13,535	50,321	47,547	3.92	4.07
Mercury	17,248	13,793	3,910	49,571	31,795	3.86	2.72
Hudson	12,595	13,110	12,069	46,988	36,538	3.66	3.13
Nash	12,599	11,136	12,653	39,796	39,839	3.10	3.41
Chrysler	10,946	9,399	12,512	36,334	36,318	2.83	3.11
De Soto	7,784	8,185	9,600	29,193	28,201	2.28	2.42
Packard	8,553	8,465	8,103	29,019	21,688	2.26	1.86
Cadillac	7,034	6,647	6,434	25,498	16,251	1.99	1.39
Kaiser	6,009	3,773	12,152	15,673	33,858	1.22	2.91
Lincoln	3,592	3,433	1,231	13,365	5,330	1.04	.46
Willys	2,525	2,139	3,143	7,992	9,695	.62	.83
Frazer	1,987	2,068	7,417	7,754	22,072	.60	1.89
Crosley	1,020	1,253	2,988	4,311	7,803	.34	.67
British Ford	618	541	1	2,172	1	.17	
Austin	244	231	1,124	891	2,623	.07	.22
All Others	521	486	498	1,955	926	.15	.09
Total	390,932	360,584	330,555	1,282,895	1,166,964	100.00	100.00

* Data from R. L. Polk & Co.

to be called the Automobile Tire and Sealed-Air Tube Dept. J. R. Lotze, formerly merchandising manager, has been appointed manager of the new department.

Morris of England Completes New Parkerising & Rotodip Plant

Morris Motors, of England, has just completed the installation, at a cost of $1 million, of a Parkerising and Rotodip paint plant, which will handle all the bodies at the Cowley factory. The Parkerising anti-rust plant comprises a tunnel 100 yards long, divided into a number of 20-ft wide separate tanks through which the bodies pass to be cleaned and rinsed before receiving the bonderizing bath. Painting operations comprise five stages: hot drying, cooling, primer painting, draining off surplus paint, and final stoving. The plant, which was installed by the Carrier Engineering Co., Ltd., is claimed to be one of the few of its kind in the world.

NEW TRUCK REGISTRATIONS*

Arranged by Makes in Descending Order According to the 1949 Four Months' Totals

MAKE	April 1949	March 1949	April 1948	FOUR MONTHS Units 1949	Units 1948	Per Cent of Total 1949	Per Cent of Total 1948
Chevrolet	28,864	33,229	28,579	109,069	100,042	36.36	28.85
Ford	14,725	14,550	28,386	52,683	71,123	17.56	20.51
Dodge	9,601	10,578	11,925	37,018	40,220	12.34	11.60
International	7,351	8,584	13,427	30,629	46,524	10.21	13.42
G. M. C.	6,843	7,445	6,603	24,138	22,998	8.05	6.63
Studebaker	4,591	5,010	4,771	18,070	17,427	6.02	5.03
Willys-Truck	1,803	2,335	2,880	8,395	7,237	2.80	2.09
Willys-Jeep	1,723	1,725	4,964	6,396	16,397	2.13	4.73
White	719	797	1,184	2,891	4,260	.96	1.23
Diamond T	509	564	1,138	2,097	3,687	.70	1.06
Mack	507	555	941	2,032	3,749	.68	1.08
Reo	366	453	1,058	1,572	4,196	.52	1.21
Divco	334	336	527	1,188	2,061	.40	.60
Autocar	166	189	240	707	1,029	.24	.30
Brockway	141	127	296	565	1,245	.19	.36
Federal	127	152	494	505	1,814	.17	.52
Crosley	79	103	312	403	893	.13	.26
F. W. D.	36	38	72	150	339	.05	.10
Kenworth	43	42	25	142	123	.05	.04
Pontiac	58	12		78		.03	
Sterling	19	14	78	72	184	.02	.05
All Others	255	317	268	1,182	1,218	.39	.33
Total	78,857	87,165	108,168	299,982	346,786	100.00	100.00

* Data from R. L. Polk & Co.

L. A. Young Retires from Spring & Wire Corp.

L. A. Young has retired as chairman of the board, president, and director of the L. A. Young Spring & Wire Corp. because of ill health. Grant L. Cook, formerly vice chairman, has been named chairman, and N. D. Ely, formerly executive vice president, has been named president. Mrs. Ola Young was elected to the vacated directorship.

1949 SAE Handbook Is Extensively Revised

Undergoing the most extensive series of revisions in its 39 years, the 1949 SAE Handbook features 31 new automotive standards and specifications, according to John A. C. Warner, secretary and general manager, Society of Automotive Engineers. Among the new standards in the 1949 edition are the first to be developed by the SAE Construction and Industrial Machinery Technical Committee on yardage ratings.

Mack Names Henry W. Dodge as Executive Vice President

Mack Trucks, Inc., has announced that Henry W. Dodge has been named executive vice president with special responsibility for sales and advertising. Mr. Dodge, who was on loan to ECA as chief of petroleum on the staff of Ambassador W. Averill Harriman in Paris at the time of his appointment, was chairman of the board and director of Air Products, Inc.

Willys Features Tri-Color Station Wagon Body

What is said to be the only mass-body paint job in the automobile industry, the new Willys tri-colored station wagon body is the result of new masking and stenciling developments in the Willys-Overland Motors paint department. The Briggs Manufacturing Co. fabricates the body and applies bonderizing and primer coats, and all other paint processes are completed in the Willys-Overland paint department.

Automotive Advertising Group Elects Officers & Directors

At the spring meeting of the Automotive Advertisers Council, Duane

Jones, advertising manager, GM's United Motors Service Div., was elected president of the Council, succeeding Walter Kirkpatrick, manager of advertising and sales promotion, Wilkening Manufacturing Co., who had served for two one-year terms. Russell Conley, advertising manager, R. M. Hollingshead Corp., Whiz Automotive Div., was moved up from treasurer to vice president, and H. C. Mohr, advertising and sales promotion manager, GM's Packard Electric Div., was elected treasurer.

Charles H. LeFevre, advertising manager, Sealed Power Corp., was named corresponding secretary, and Edward F. Todd, advertising manager, The Imperial Brass Mfg. Co., was chosen recording secretary.

Members elected to the Board of Governors were: J. D. Hershey, advertising director, Dayton Rubber Mfg. Co.; C. B. Riddick, Koppers Co., Inc.; T. Faxon Hall, sales promotion manager, Walker Mfg. Co. of Wisconsin; Lester C. Dobrunz, sales promotion manager, Wagner Electric Co.; and Samuel R. Robinson, advertising manager, United States Asbestos Division of Raybestos-Manhattan, Inc. All men were elected to two year terms of office.

Chevrolet Buffalo Plants Hit Output High

Production and employment in the two GM Chevrolet Motor Div. plants in Buffalo have hit new peacetime highs. The plants are turning out just as many automotive parts as possible, and employment in the two plants has crossed the 6000 mark.

Fairchild to Make and Sell Helioplane

The Helioplane (shown on page 22 of the June 1st issue of AUTOMOTIVE INDUSTRIES) will be made and sold by the Fairchild Engine and Airplane Corp. Fairchild will manufacture the plane in the higher horsepower classifications for specialized commercial and military uses.

World's Sports Cars at California Show

Sports cars of the world were brought together for the first time at the International Automobile Show at Oakland, Calif., in June. American cars exhibited included a custom Cadillac costing $12,500; the Oldsmobile featuring the Rocket engine; the new Nash; and others. Foreign cars ranged from the MG sport car to the Italian Alfa Romeo.

Douglas Announces New Super DC-3

The Douglas Aircraft Co., Inc., has announced a new modernized DC-3 which is said to have been improved by 20 per cent over the original model. The span of the new Super DC-3 is 90 ft; overall length is 67 ft, 8½ in.; and height 18 ft, three in. It has a gross weight of 29,500 lb, and a cruising speed of 243 mph.

Fairchild Licenses Company to Use Al-Fin Process

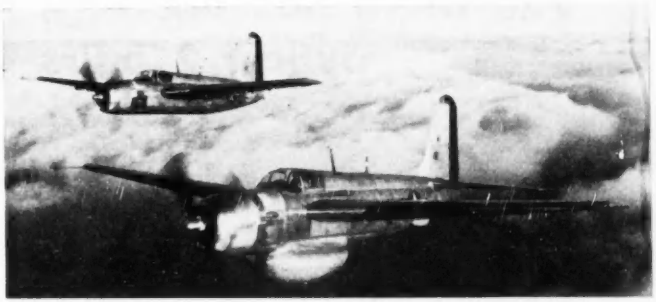
The Fairchild Engine and Airplane Corp. has licensed the United Engine and Machine Co., San Leandro, Calif., to use the Al-Fin process in manufacturing bi-metallic pistons, bringing to six the number of Al-Fin licensees in the U. S. and abroad.

Cornell Develops Fiberglas Blades for Helicopters

Fiberglas helicopter blades have been developed by the Cornell Aeronautical Laboratory, and helicopters equipped with molded Fiberglas blades were successfully test-flown recently by the U. S. Air Force's Air Material Command at Dayton, O. The blades are about 22 ft long, with an average width of 20 in. Molded integrally in a single operation, they utilize a high-strength "sandwich" type construction.

Standard Products Holds Open House

That the motor car contains an enormous variety of hidden and unobtrusively located parts was made evident at the recent open house of The Standard Products Co., Port Clinton, O., Div., on the occasion of of its 15th Anniversary. Specializing in the manufacture of automotive window channel and weatherstripping, the company claims the distinction of making over half the supply of these parts for the industry, adding that from one to 30 parts it produces are found in practically every car on the road today. Some idea of the variations specified by motor car producers may be gained from the fact that S-P channel and weatherstrip are made on tubing machines in 50 basic sections, these being translated into around 800 different shapes and sizes. The average car, according to the company, contains about 50 ft of chanel and weatherstrip.



SUBMARINE POISON

Photographed in operational formation for the first time, the Grumman XTB3F-1S and XTB3F-2S, the Navy's newest anti-submarine aircraft, is powered by a Pratt & Whitney R-2800 engine. This plane, to be known as the Guardian, can be operated from carriers.

Redding to Head Aircraft Research Group

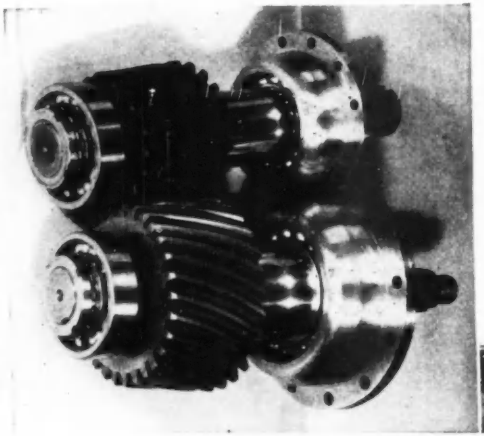
James D. Redding has been appointed executive director of the Committee on Aeronautics of the Research and Development Board, National Military Establishment, succeeding John B. Jacob. Mr. Redding, who has been manager of the Aeronautical Department of the Society of Automotive Engineers, Inc., New York, since 1941, was an aeronautical engineer with the Civil Aeronautics Administration and its predecessor agencies from 1936 until 1941.

Certify Constellation Under ICAO Standards

Lockheed's Constellation is the first airplane to be made eligible for certification under the International Civil Aviation Organization (ICAO) standards.

(Turn to page 58, please)

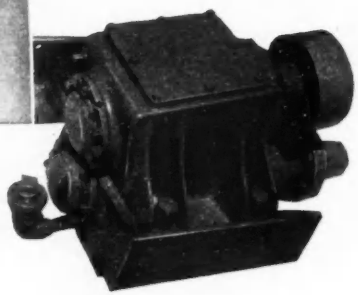
Vee Drive Ball Bearings outlast 2 pairs of engines!



The New Departure ball bearings supporting these spiral bevel gears take heavy thrust and radial loads, but they never require adjustment for wear.

The New Departure ball bearings in the original Vee Drive gear box for Huckins Engines-in-stern yachts, installed 15 years ago, have never required replacement or adjustment—*have outworn two pairs of engines.*

This is the kind of performance that *keeps* New Departures regular equipment in these drives—and, it is typical of the rugged dependability that all builders of fine machines or equipment need for their products in the times ahead.



Vee Drive Gear Box used in Fairform Flyer Yachts with Engines in the stern.

Nothing Rolls Like a Ball

NEW DEPARTURE
BALL BEARINGS

70

NEW DEPARTURE • Division of GENERAL MOTORS CORPORATION • BRISTOL, CONNECTICUT • BRANCHES IN ALL PRINCIPAL CITIES

Special to AUTOMOTIVE INDUSTRIES

The Motor Vehicle Vacuum in Spain

By H. Edward Knoblaugh

MADRID, SPAIN

THE Spanish government, faced with an inadequate and rapidly deteriorating motor transport system, is desperately seeking ways and means of putting more cars and trucks on its highways. The obvious solution, of course, would be either the creation of an automobile industry sufficient to fill Spain's needs, or the importation of enough motor vehicles to bring the Spanish fleet up to requirements and provide a steady flow of replacements.

Shortage of steel and other materials, combined with government regulations which tend to discourage essential foreign enterprise and investment, has stood in the way of an autonomous Spanish motor vehicle industry. Lack of foreign exchange and prohibitive tariffs have cut automobile imports to a trickle.

Some nations like France and Great Britain have special commercial agreements with Spain which either exempt completely or considerably lower Spanish import taxes. There is, however, a "fondo de retorno" or special impost on privately imported vehicles to cover subsidization of exports. Inasmuch as all vehicles shipped to Spain from the United States are privately imported, all American automobiles are subject to a prohibitive 70 per cent impost.

An apparent government policy which insists upon control by INI (National Institute of Industry) of all new automobile developments in Spain, has been the stumbling block which has been preventing big concerns like Ford and General Motors from operating on a major scale in this country. In effect, INI is preventing the establishment in Spain of any major motor vehicle industry it doesn't control.

Although technically Spain has a reputation for being able to produce good motor products, shortages of steel and other difficulties have prevented, and are likely to continue to prevent, the manufacture of passenger cars or trucks at a price which would enable this country to enter the foreign competitive market.

Spain has never been able to overcome the problem of supply. Existing stores are very small and there are many conflicting demands for steel needed for ship building, railroads and other purposes. Spanish railroads are deteriorating much faster than they can be kept up.

Survey Discloses How Government Control Has Prevented Revitalization of Automobile Industry and Motor Transport System

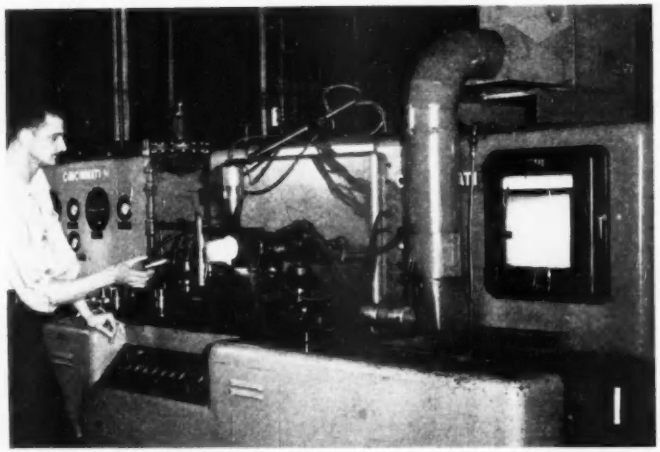
The Hispano Suiza company, founded in 1904, was Spain's first venture in automobile manufacture. The car produced in this company's plant at Barcelona was good, in the estimation of foreign critics, who hold a high opinion of the ability of Spanish engineers and technicians. As late as 1947, a total of 2557 Hispano-Suizas were still registered as operating. However, the cost of these automobiles was prohibitive for most people.

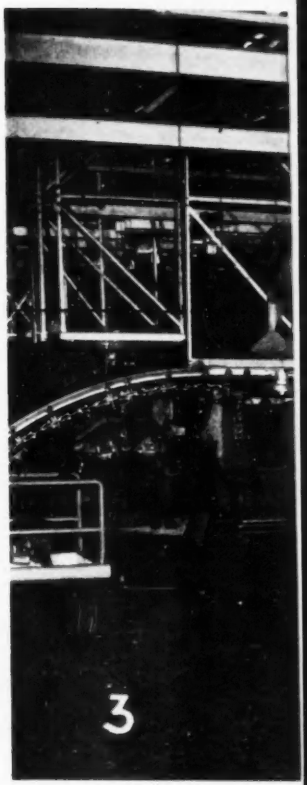
In 1927, under the Primo de Rivera dictatorship, a set of laws was passed which were intended to promote the manufacture of less expensive automobiles in Spain. Under these laws, Ford came to this country in 1930 and set up an assembly plant at Barcelona. Here, quite a number of vehicles were assembled, partly of Spanish materials. Under the republic which was inaugurated in 1931, the automobile industry in Spain ran into trouble and during the civil war, 1936-39, it broke down completely.

The Ford plant at Barcelona has been more or less idle since World War II. Some trucks have been assembled there, but one plant expert said that the total number produced since 1945 would not exceed 1000. It is understood that the Ford people would like to set up operations on a large scale in Spain, but that they are not interested in going ahead with any plans while INI insists on having financial control.

(*Turn to page* 68, *please*)

Buick's New Setup for Tripled Dynaflow Production



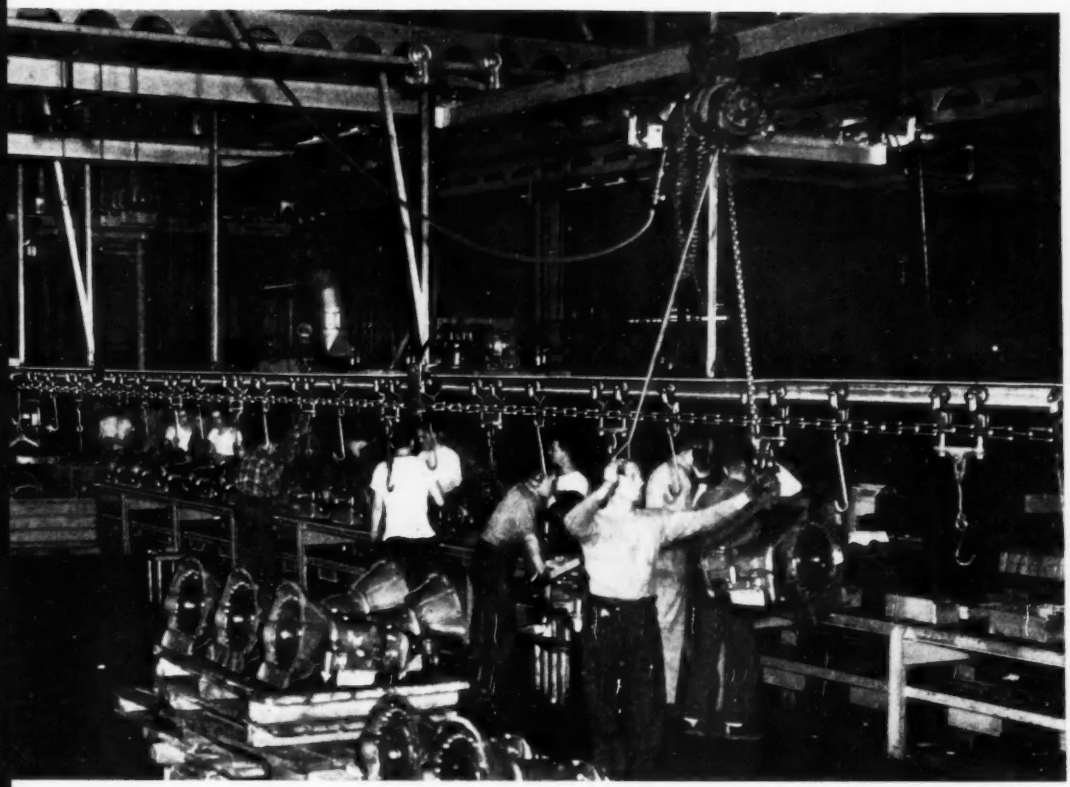


By Joseph Geschelin

1. *Selective hardening of the hub is done in the new Cincinnati Flamatic unit shown here. The operator is holding one of the parts. Hardening is in process at the center station.*

2. *The primary pump cover for Series 50 transmissions, of SAE 1008 steel, is drilled and chamfered in two steps in the special Kreuger machine shown in this view. Work is loaded and unloaded at the upper left hand station near the operator's hands. Drilling is done at the lower station in the foreground; chamfering at a corresponding station on the opposite side of the machine.*

3. *View of the final assembly line for Dynaflow transmissions. Finished units move to the end of the conveyor at the extreme right. In the background at the left are the ten test machines.*



MANY major changes have taken place in equipment and manufacturing processes since the Buick Dynaflow transmission was groomed for production early in 1948. Since publication of highlights of the initial set-up in Buick's plant 10 (see AUTOMOTIVE INDUSTRIES, May 15, 1948) production has been tripled by the adoption of Dynaflow on the Series 50. Output was increased from the original goal of 20 an hour for Roadmasters to an additional 40 an hour for Supers.

Incident to the major increase in output, many of the operations common to both units were shifted to new machine tools of greater productivity, marking an advance in manufacturing economy. Moreover, mechanization of the operation has been greatly expanded by the introduction of many thousands of feet of monorail conveyors which are employed for transporting parts throughout the plant and for feeding the sub-assembly and final assembly lines. There is also an extensive monorail system for transporting finished Dynaflow units to shipping docks.

Assembly lines too have undergone major metamorphosis. A year ago there was just one merry-go-round line for assembly and only one final testing machine in Plant 10. Now they have ten test machines. Too, they have added a merry-go-round assembly line for the Series 50. In addition, there is a 120-ft final assembly line, in the form of two parallel chains. The inner line takes transmissions from the merry-go-round sub-assembly lines and carries them along the row of ten testing machines for a thorough test schedule.

Accepted units are transferred to the same conveyor, continuing along the assembly line to the outer conveyor where minor parts are added. The conveyor continues through a hot washing machine to remove all oil, and finally, the unit is completed by the addition of the oilpan.

The object of this article is to present a picture of a few of the new techniques of recent origin. It may be noted that all operations are in a state of flux, since they are under constant observation to determine short-cuts and improvements. Consequently, as time goes on there will be other noteworthy changes in process stemming from improvements in manufacturing methods.

During the war a number of General Motors divisions took advantage of the then new technique of shot blasting with "cereals." This has become an important practice in Plant 10. Rotating wheels such as the aluminum castings for the pump, turbine, and stator elements are shot-blasted in a large Wheelabrator with a rotary table, using ground walnut shells as the shot. This is a simple and successful

means of removing burrs and sharp edges without affecting the contours.

The larger flat aluminum parts—mostly die castings—are shot-blasted by hand in a Wheelabrator cabinet machine. Surface finish is more important on these parts and this requires an even finer kind of shot material. Consequently, these parts are blasted with ground corn cob. This produces an excellent surface finish and at the same time removes burrs quite effectively.

The brake band, a part requiring considerable machining, has been simplified in operations to some extent. Latest development is the addition of a large vertical Cincinnati Hydro-Broach, Model 10-66, to supplement a smaller machine of the same make. This is a dual-ram machine having two fixtures on the table. One station does the roughing of the brake anchor boss; the other does the finish broaching to size. Ram speed for this operation is about 25 fpm.

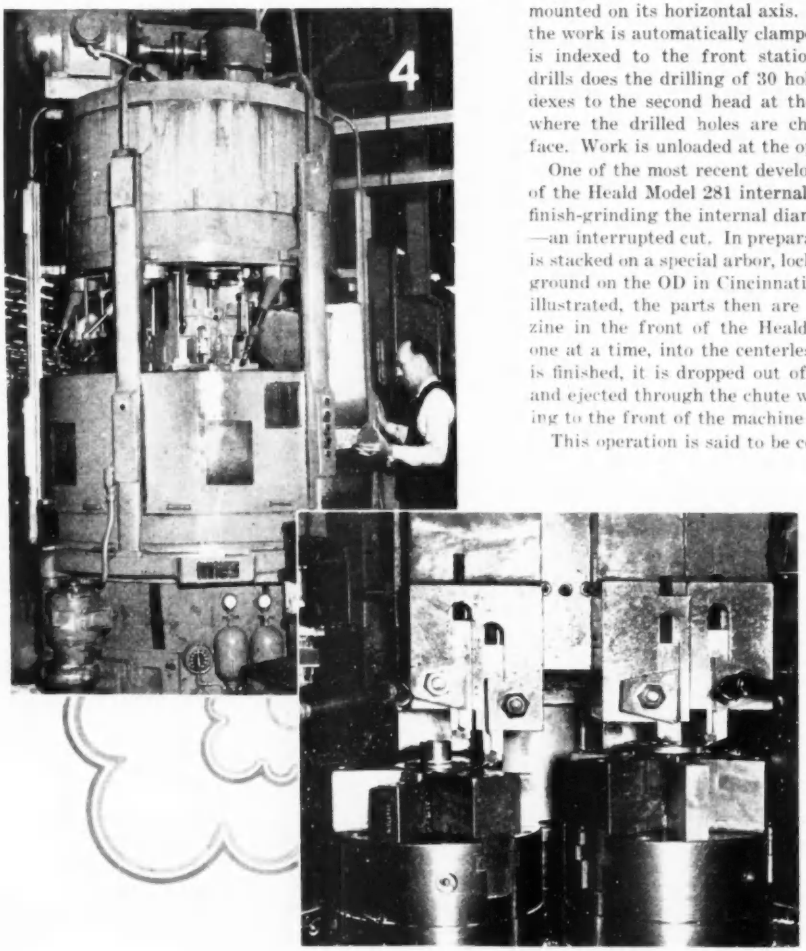
Dynaflow Production

Another improvement in brake band processing—now undergoing production testing—is the use of a unique material for shot peening the inner surface. For some time bands have been shot blasted with an abrasive grit. The object of this operation is to prepare the surface for bonding of the metallic facing and, at the same time, to impart some spring properties to the band when it is cut apart at the anchor boss. The latest wrinkle is to shot peen with shot consisting of tiny pieces cut from wire. This produces an excellent surface for bonding and develops somewhat greater spring-back in the band.

The primary pump cover for the Series 50 transmission, a large-diameter steel disk stamped from SAE 1008 steel, now is drilled and chamfered in a large special-purpose Kreuger machine in a set-up of high productivity. As illustrated, this machine is of two-way type with a four-station rotary indexing table mounted on its horizontal axis. At the loading station the work is automatically clamped on its periphery and is indexed to the front station where a cluster of drills does the drilling of 30 holes. The table then indexes to the second head at the rear of the machine where the drilled holes are chamfered on the outer face. Work is unloaded at the operator's station.

One of the most recent developments is the adoption of the Heald Model 281 internal centerless grinder for finish-grinding the internal diameter of the stator cam—an interrupted cut. In preparation for this, the work is stacked on a special arbor, locked in place, and finish-ground on the OD in Cincinnati external grinders. As illustrated, the parts then are loaded into the magazine in the front of the Heald machine for feeding, one at a time, into the centerless grinder. As a piece is finished, it is dropped out of the regulating wheels and ejected through the chute which may be seen looping to the front of the machine from the rear.

This operation is said to be considerably faster than



4. *Turbine hubs are machined—in a double-index set-up — in this Bullard Type K 12-spindle, Mult-Au-Matic. The inset (right or left) shows a pair of work stations, alternate stations being arranged to handle first and second index operations, respectively. Incidentally, this view gives a sampling of the variety of cemented-carbide tooling. A solid tool of circular section is used at the right, and a square section tool at the left.*

the previous method and to provide better control of size.

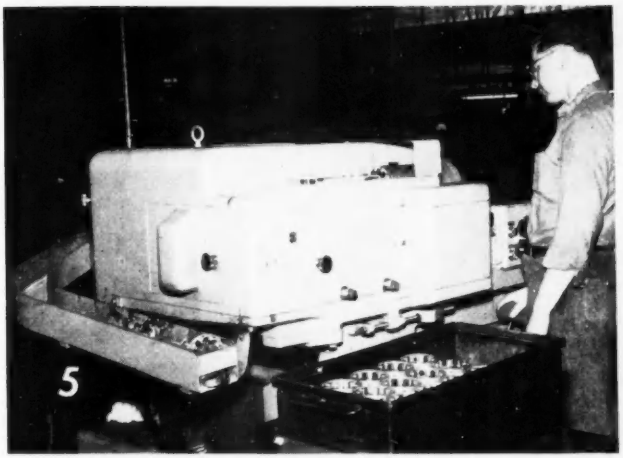
Some time ago we published a brief description of the first installation of the now well known Cincinnati Flamatic hardening machine in Plant 10. More recently a second machine has been installed for selective hardening of the hub. This part has a relatively large diameter flange with hub extensions on each side. The flange must remain soft; moreover, one side of the hub, which has two dogs, is required to have the dogs soft. To this end, the torch is so arranged as to harden only a narrow band on this side, leaving in soft state a section next to the flange and an outer band containing the dogs.

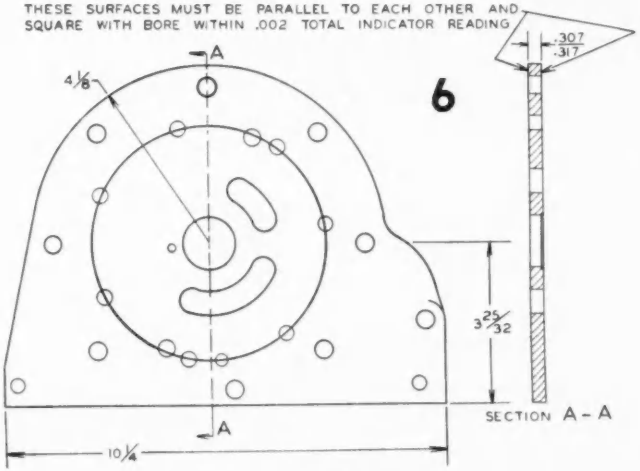
As illustrated, the hub is mounted on a rotating spindle, with torches arranged on both sides. Hardening is accomplished simultaneously on both ends at the extremely high rate of about 90 pieces an hour. Hardness is held at Rc 60.

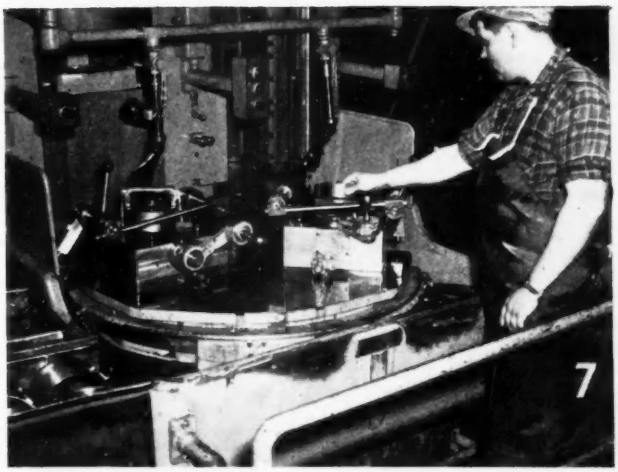
An interesting example of the influence of higher production requirements is found in the machining of the primary pump cover for the Series 50. On the same part—somewhat larger in diameter—for the Series 70, turning is done in chucking machines. The part for the Super, however, justifies tooling on an eight-spindle Bullard Mult-Au-Matic. Cutting is done with cobalt steel tools.

The turbine hub, a small flanged part, is produced in what is said to be one of the earliest installations of the Bullard Type K Mult-Au-Matic. Called the Twin-Six, this machine has 12 stations and is arranged for a double-index cycle so as to finish

(*Turn to page* 56, *please*)





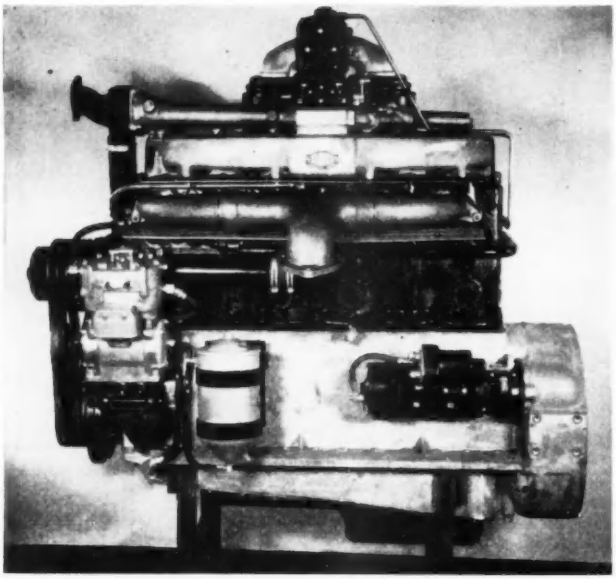


5. *This is a close-up of the Heald Model 281 internal centerless grinder set up for grinding the bore of stator cams. Work is loaded into the magazine which may be seen at the extreme right at the top of the machine. Finished parts are automatically ejected through the chute on the left side.*

6. *Drawing of the front pump cover—a gray iron casting—which is ground in several stages on Besly machines, as described in the text.*

7. *Brake anchor boss of the brake band is finished to form in two settings in the new Cincinnati Model 10-66 vertical Hydro-Broach surface broaching machine. Ram speed is 25 fpm.*

GMC Largest



Left side view of engine assembly.

Major Specifications GMC 707 Engine

Type	Valve-in-head
No. cyl	6
Bore (in.)	5
Stroke (in.)	6
Displacement (cu in.)	707
Compression ratio	5.75 to 1
Gross hp (max.)	225 @ 2500
Net bhp at governed rpm	196 @ 2200
Gross torque (max.) lb-ft	576 @ 1200
Net torque (max.) lb-ft	550 @ 1000
Weight, dry, with accessories (lb)	1715
No. main bearings	7

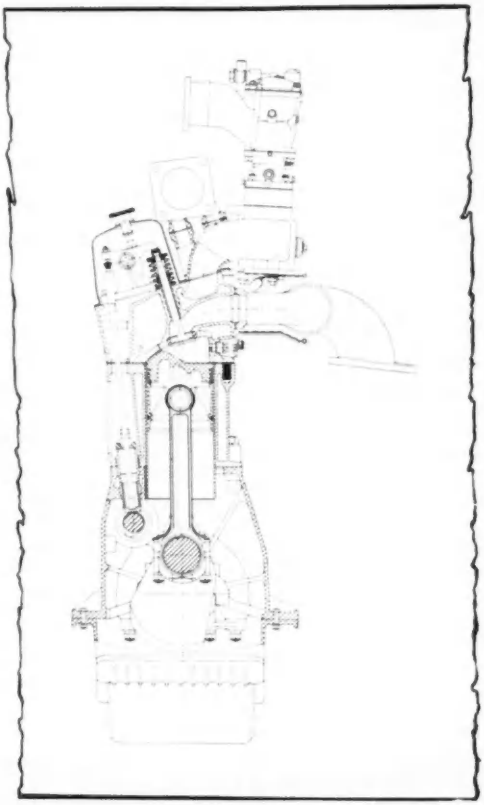
WITH the introduction of its postwar heavy duty truck line, GMC Truck and Coach Div., General Motors Corp., has added the largest gasoline engine powerplant hitherto available in its truck models. The Model 707 gasoline engine is six-cylinder, valve-in-head, with a conservative rating of 225 gross bhp at a governed speed of 2200 rpm. Among its major features are: Seven main bearings, directed flow water circulation, positive crankcase ventilation, and other items to be mentioned more in detail. The valve system boasts sodium-cooled exhaust valves with rotators, and automatic hydraulic valve lash adjusters.

As illustrated, the disposition of externally-mounted elements and accessories is as follows: Left side—inlet and exhaust manifolds, carburetor, governor, air compressor, oil filter, starting motor; right side—oil cooler, oil filler, crankcase ventilator inlet, fuel pump, distributor, and generator.

Transverse and longitudinal cross-sections of this engine are reproduced here to permit visualization of the valve linkage, combustion chamber and piston, as well as to show unique features of structural design.

The cylinder block is a one-piece electric furnace alloy iron casting with cylinder barrels fitted with replaceable dry liners. The liners are of special analysis chrome-nickel alloy cast iron, heat treated. Water jackets extend the full depth of the block with ample water passages between adjacent cylinder barrels.

Cylinder heads are castings of special chrome-nickel



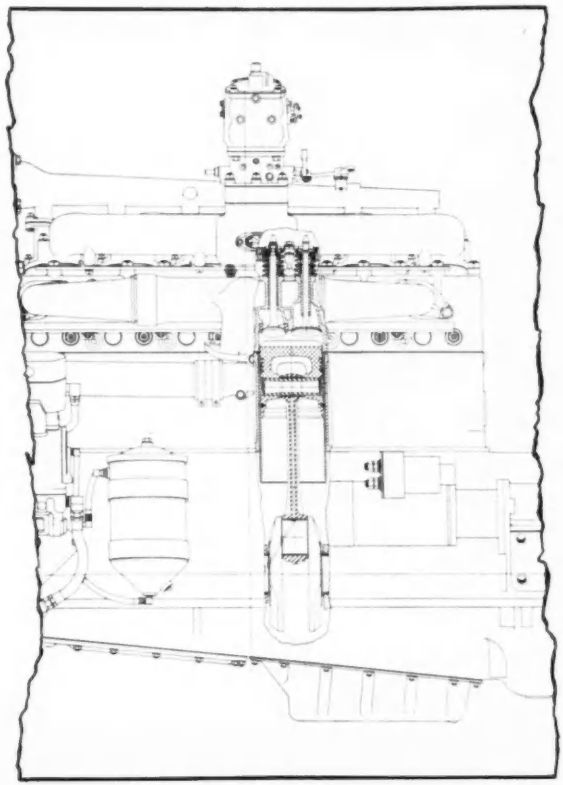
Transverse cross-section of GMC 707 engine showing detail of domed piston and special combustion chamber form. Note that carburetor is set vertically when engine is installed in vehicle.

Announces Its Gasoline Engine

By Joseph Geschelin

Six-Cylinder, Valve-in-Head Truck Powerplant Has 707 Cu In. Piston Displacement and Develops 225 Gross BHP at Governed Speed of 2200 RPM

alloy iron with combustion chambers of unique form to control detonation. Ample water passages around valves and spark plugs promote proper cooling. Exhaust valve seats are of hard alloy steel, faced with Stellite. The front and rear heads are interchangeable on the same engine with or without valve mechanism.



Longitudinal view of GMC 707 engine with one cylinder in cross-section.

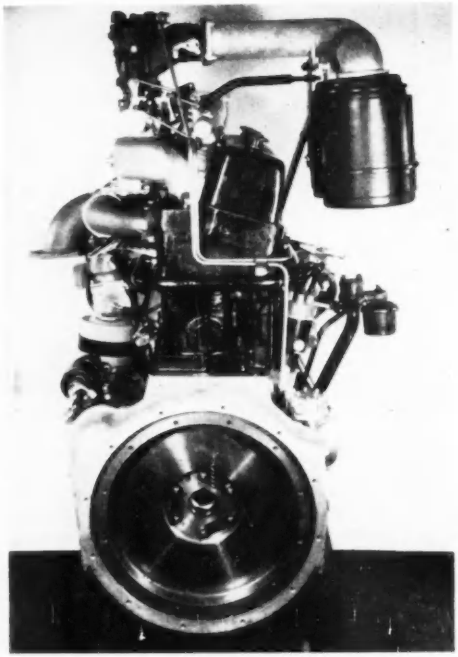
The crankcase is made in two parts—the upper half, and oil pan—both of cast aluminum alloy. The upper half is of deep section with a skirt below the center line of the crankshaft for increased rigidity. Additional rigidity is secured by means of a tie bar at the center bearing. The lower half has a transverse web, serving the dual function of providing rigidity as well as a baffle to prevent surging of oil.

The front cover is ribbed on the under side to provide radiating area for oil cooling. The oil pump is located above the rear cover and can be removed through the rear opening. The upper half of the flywheel housing is integral with the crankcase upper half, while the lower half is integral with the oil pan.

The seven-bearing crankshaft is a forging of chrome-moly alloy steel, heat treated and fully counterweighted. All crankpin and main journals are selectively hardened by the Tocco process. The shaft is balanced dynamically to $\frac{3}{4}$-oz. in. Vibration is controlled by means of an externally mounted harmonic damper of bonded rubber type.

Main bearings are of steel-back, precision type, with Moraine Durex bearing alloy. Upper halves are doweled in the crankcase while lower halves are doweled in the bearing caps. Shims are provided between bearing caps and the crankcase to take up reasonable wear.

Pistons are permanent mold castings of low-expansion aluminum alloy and heat treated. They have a special stepped-dome head to control combustion. This form provides maximum volume around the spark plug for even flame spread, and a restricted volume at the opposite end for quenching the



Rear view of engine assembly.

flame. Pistons are cam ground. Ring set-up comprises five cast iron rings, four above the piston pin, one below. The top compression ring is chromium plated, 3/32-in. wide. Second and third compression rings are taper-faced and 1/8-in. wide. The fourth ring is a heavy duty oil control ring, 3/16-in. wide, while the fifth, mounted below the piston pin, is a continuous channel oil control ring, 3/16-in. wide.

The piston pin is 13/8-in. in diameter, of tubular alloy steel, hardened and ground. It floats both in the rod and piston and is retained by snap rings in the piston.

Connecting rods are I-beam section drop forgings, heat treated, with oil lead for pressure lubrication to the piston pin. Shims are provided at the crankpin end for wear adjustment. Rods are machined to a standard weight, each end being held to 1/8-oz tolerance. Rod bearings are of Moraine Durex type, precision, steel-backed.

The camshaft is drop-forged of carbon steel, supported in the crankcase in five bronze bearings.

The valve operating mechanism deserves special attention. The barrel type valve lifters are of heat treated cast iron, Granoseal coated, hollow for lightness, and operate in individual cast iron guides. They can be readily removed from the side of the engine without disturbing the camshaft. Tubular push-rods operate the drop-forged and heat treated rocker arms which are fitted with steel backed, lead-bronze lined bushings. The end of the rocker arm bearing on the valve stem is hardened and ground. Automatic, hydraulic valve lash adjusters are mounted on the upper end of the push-rod.

Intake and exhaust valves are of poppet type with 30-deg seats. Intake valves are of alloy steel forgings, heat treated and ground. Exhaust valves are Stellite-faced, sodium-cooled, and fitted with rotators. Dual valve springs are employed. Valve timing is as follows.

Intake opens—BUDC 10 deg.
Intake closes—ALDC 50 deg.
Exhaust opens—BLDC 55 deg.
Exhaust closes—AUDC 23 deg.
Firing order—1-4-2-6-3-5.

The timing gear train consists of two gears—a steel crankshaft gear and a heat treated cast iron camshaft gear. Both gears have helical teeth of barrel shape for quietness and to prevent end loading.

Both water pump and fan are driven at engine speed by 7/8-in. triple V-belts which also drive the generator. The water pump is of centrifugal, packless type, integral with the fan. The pump shaft has a spring loaded, self adjusting seal at the impeller end and is supported on two annular ball bearings.

The lubricating system provides oil under pressure to all main bearings, rod bearings, piston pins, distributor, drive gear, valve rocker arm shafts, valve lifters, timing gears, and air compressor. Camshaft bearings are lubricated from oil reservoirs cast in the crankcase directly above each bearing. The entire discharge of the oil pump is delivered through the oil cooler before entering the main oil gallery. In addition, the oil is filtered through an AC oil filter mounted on the opposite side, oil entering the filter through a small metering hole under reduced pressure.

Crankcase ventilation is so arranged that air enters through an oil bath air cleaner on the engine oil filler pipe. Air, vapor, and crankcase fumes are vented past the valve lifters and push rods, into the cylinder head cover, then out through two spring-loaded valves attached to the cylinder heads, and into the No. 2 and No. 5 inlet ports.

The intake manifold is a single piece aluminum casting with six ports feeding individual cylinders. The heat jacket at the center is water-heated.

The carburetor is a Zenith 29D Series, 1 3/4-in. heavy duty, down-draft duplex, double venturi, plain tube type with extra large float chamber and double float. The metering system consists of the main metering jet, a vacuum operated power jet, and an idle jet. The main jet supplies fuel for the idle and part throttle driving range while additional fuel is supplied by the power jet for full power operation. The accelerating pump has a vacuum operated piston to provide additional fuel for rapid engine pick-up. The idle system is of two hole type with single idle adjusting needle.

Exhaust manifold design has been given special attention to allow for expansion at high temperatures without tendency to warp and crack. It is made of stainless steel castings, in three sections with slip joints, and a center outlet. This construction is said to maintain tight joints at the cylinder head face to which the manifold is bolted.

The new AC, six-valve fuel pump used on this engine is driven from an eccentric on the camshaft. Two

(*Turn to page* 90, *please*)

Large Attendance at National Truck-Trailer Show

By R. Raymond Kay

COST-SAVING ideas and equipment for the trucking industry were viewed by 28,000 visitors to the first National Truck, Trailer and Equipment Show, held in Los Angeles' Pan Pacific Auditorium in June. Almost every maker of trucks and trailers, of the engines that power them, tires, fuels and lubricants, lightweight metals, accessories and parts were represented in the 163 displays.

New and interesting products gave many ideas for increasing payloads and decreasing costs. Especially noticeable was the amount of materials handling equipment developed for the trucking industry. Advance Auto Body Works, Los Angeles, displayed a two-axle semi-trailer with Ford three-axle tractor designed to carry 1048 cases of Coca-Cola, a 22 ton net load. Fruehauf Trailer Co. showed for the first time a 35-ft stainless steel refrigerated semi-trailer featuring mag-

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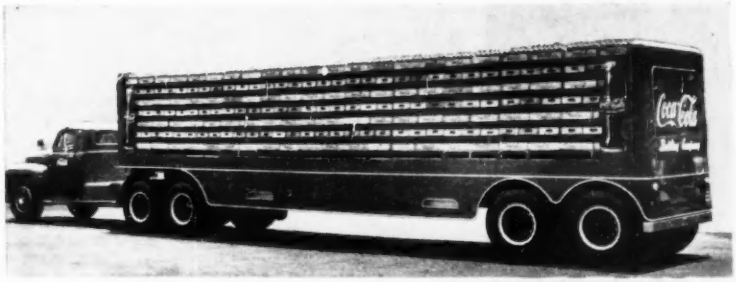
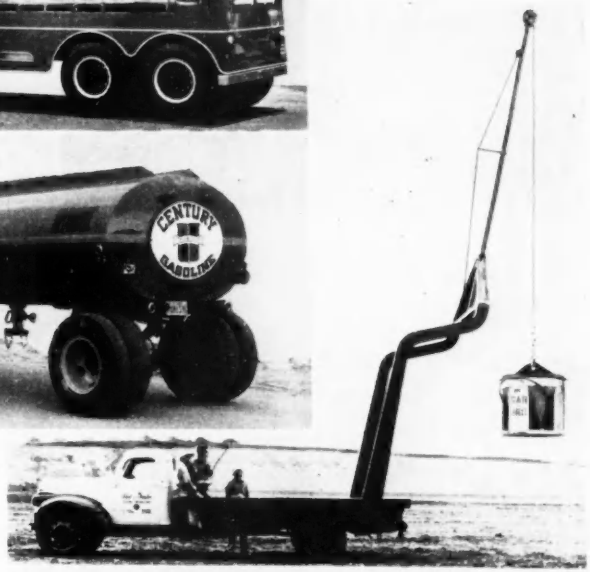




(Top) Advance Auto Body Works two-axle semi-trailer with Ford three-axle tractor carries 1048 cases of Coca-Cola, a 22 ton net load.

(Center) Frameless tank trailer built by Fruehauf Trailer Co.

(Right) Ten ton hydraulic boom crane displayed by Crescent Tool Co.

Conomatic five-in., four-spindle bar machine which features quick setup or change. →

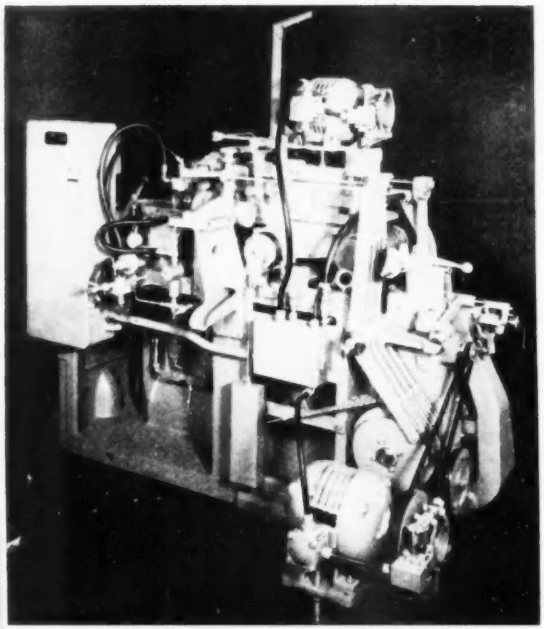
Four Vermont Display Newest

By H. H. Roberts

A SPECIAL machine tool show at which the machines were exhibited and demonstrated in the makers' own plants was held during the week of June 20 by four well known New England manufacturers—Jones & Lamson Machine Co., Fellows Gear Shaper Co. and Bryant Chucking Grinder Co., of Springfield, Vt., and Cone Automatic Machine Co., Windsor, Vt. Attendance was excellent and far surpassed the expectations of the sponsors of the show.

The latest type of production machines were displayed in operation, featuring extremely high rates of metal removal, automatic loading and fine finishes as well as ease of changeover for economical short runs.

Among the 18 machines at Fellows Gear Shaper Co. was a new gear finisher which employed a single edge, multiple-tooth cutter with face cutting action. It corrects for inaccuracies in gears as they come to the machine and employs a cutter which can be resharpened by grinding one face. Another interesting machine at the Fellows exhibit was a 36-in. gear shaper which produced 3 pitch gears with five in. face width, taking



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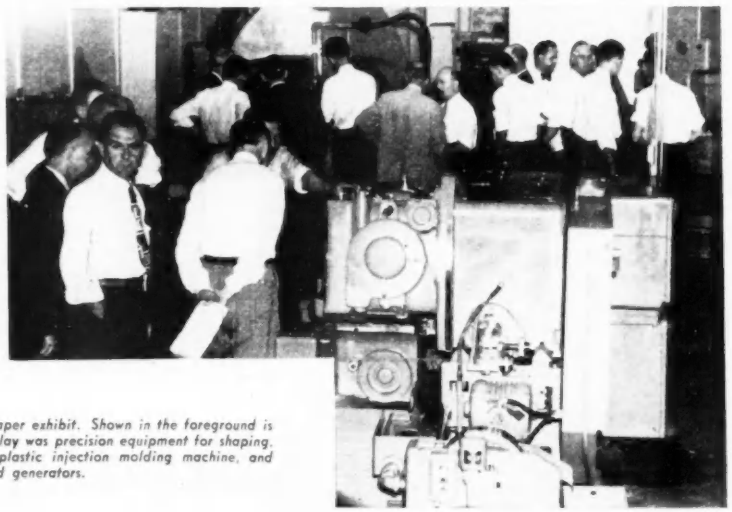
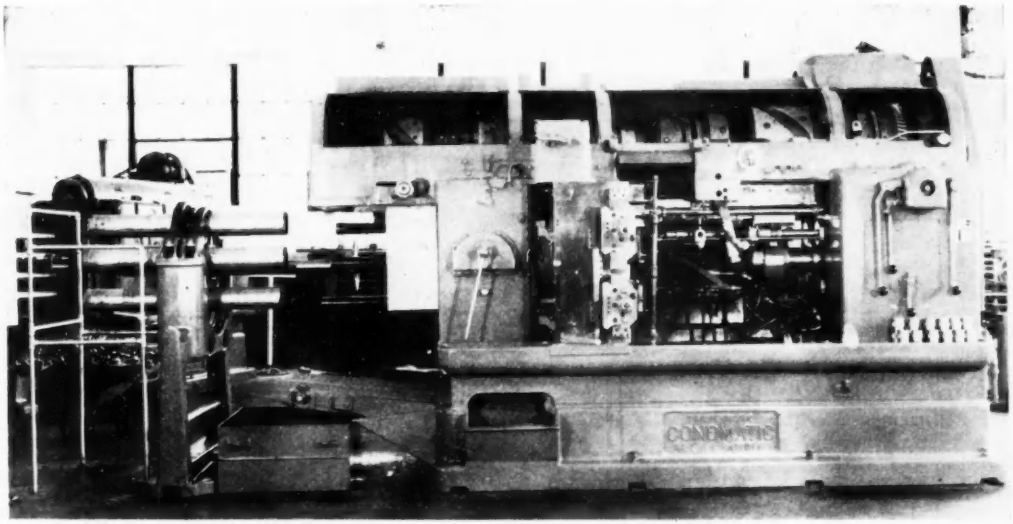
Bryant No. 2209-D automatic grinder with loading mechanism for automatic grinding of the bore and face of cup type needle bearings.



View of part of Fellows Gear Shaper exhibit. Shown in the foreground is a new gear finisher. Also on display was precision equipment for shaping, shaving and checking gears, a plastic injection molding machine, and thread generators.



Machine Tool Builders Equipment and Techniques

Large Number of Visitors at Plant Demonstrations in Springfield-Windsor Area

a cut of 0.042 in. Cutting, shaving, and inspection of 64 pitch gears were demonstrated in a three-machine set up consisting of a three-in. gear shaper, a No. 4 fine pitch shaver, and a No. 8M Red Liner gear checking machine.

Bryant Chucking Grinder Co. displayed six machines together with the complete line of Bryant gages. Among the company's newest pieces of equipment was a No. 2209-D cam-controlled automatic grinder with loading mechanism for the complete automatic grinding of the bore and face of cup type needle bearings. Its work cycle is 12 seconds per piece including automatic loading and unloading. A Bryant tool room grinder was shown in operation finishing holes to one micro in. surface finish in about three minutes. Standard speeds, feeds, and a 60-grit wheel were used. A No. 216 automatic internal grinder finished the large bore of an automotive connecting rod from rough bore to 20 micro in. finish and 0.0005 in. size limit in a 30-second cycle.

Eight machines in addition to the line of J&L comparators and die heads were shown by Jones & Lamson. The exhibit included high-speed, heavy duty Fay lathes and turret lathes designed and powered to take full advantage of carbide tooling, and a universal thread grinder.

Three 16-in. Fay automatic lathes were set up for machining a 6.330-in. diameter ball bearing outer race. The first bored, faced one end and formed a corner

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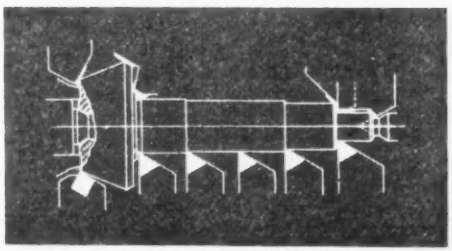


Sketch of tooling for turning rear axle drive pinion forging in 16-in. Fay lathe at the Jones & Lamson exhibit. Spindle speed—1200 rpm, cutting time—8.5 sec, floor-to-floor time—17 sec, maximum horsepower—66. Maximum surface speed is at the high rate of 1185 fpm.

High Compression Without

By Alex Taub

FUEL must be viewed as an engine component, engineered and designed to fit under all the conditions that will be demanded of the engine. In fact, engine fuel today is the best designed engine component of all. This fuel is neither a "circumstance" nor "happenstance," its molecular construction has been carefully built up over the years to fit the widest spread of engines under the widest possible use.

The equipment used to bring this fuel into being is as inflexible as a very large power press and with just as many limiting dimensions. Dies in a press can be changed, but the press is not thrown away every time an engineer sees a better way to do a job. It is the same way with a refinery. Changes can be made which affect a part of the equipment, but not very often can all of it be thrown away.

Like the manufacturer whose equipment makes engine components, the fuel maker should be able to amortize his yearly changes in equipment. Again like the engine component maker the fuel maker should—and we are sure he will—resist changes that reduce productivity of his plant.

W. M. Holaday, in his paper, SAE Annual Meeting, January, 1948, outlines an interesting series of relative plant values for various octane rated fuel.

Fig. 6 shows a curve submitted by him setting forth the investment for a 100,000 bbl plant for different final fuels. We note that:

Straight run 70 octane fuel = $17,500,000
Thermal cracking 74 octane fuel = $23,000,000
Thermal reforming 83 octane fuel = $25,500,000
Catalytic Polymerization 84 octane fuel = $28,000,000
Catalytic Cracking Alkylation 92 octane fuel = $65,000,000
(All of these fuels include 1 cc T.E.L.)

From the above it is quite clear that if we are to consider quantity of fuel in ratio to investment that we must find a way to obtain 100 octane results with 84 octane fuel. This we are certain is nearer probability than sufficient higher octane fuel at a reasonable price.

Let us look for a moment on the projected costs of plants for the making of fuel from coal: 2.5 barrels of crude per ton of coal, 100,000 bbls = 40,000 tons of coal per day.

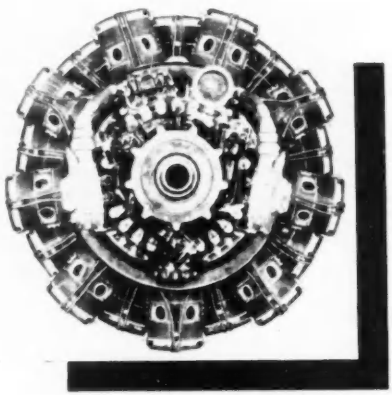
*Plant cost for 100,000 bbls. per day**

Hydrogen production	190	million	dollars
Hydrogenation	256	"	"
Distillation and recovery	51	"	"
General utilities and plant	278	"	"
Total	775	"	"

* Bureau of Mines' Figures.

Unless atomic energy becomes a practical possibility in the next ten years we may have to consider providing synthetic crudes to a capacity of ten such plants. This would require about 90 million tons of coal per year and plant equipment of $7\frac{3}{4}$ billions of dollars.

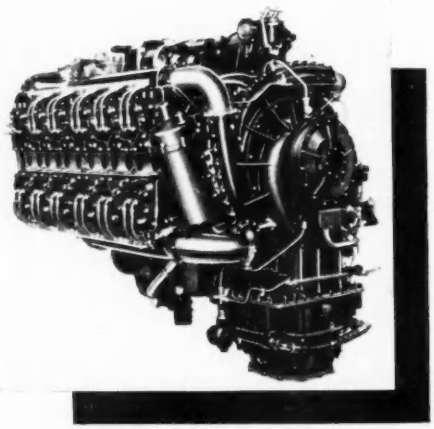
Of the three immediate expansion programs for fuel products — 1. expansion of production of present fuel, 2. synthetic production of present fuels for insurance, and 3.



(A) Bristol Centaurus aircooled radial aircraft engine. It employs one stainless steel sleeve valve per cylinder.

(B) Napier Sabre 2200 hp sleeve valve aircraft engine.

(C) Rolls-Royce "Eagle", a sleeve valve H-type aircraft engine.



High Octane Fuel

What Are its Possibilities?

PART TWO

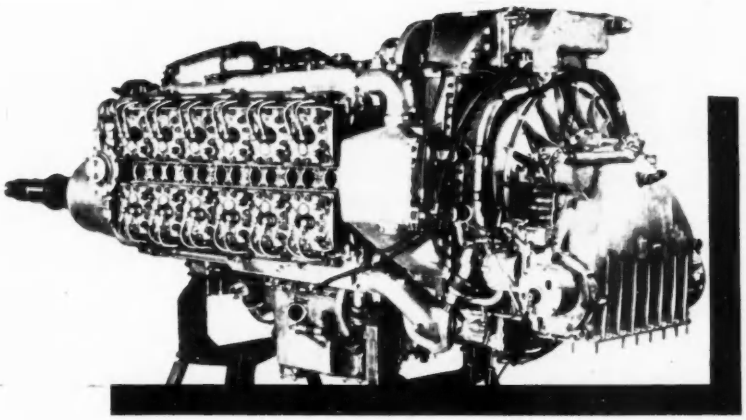
Part II of a Four-Part Article. Costs of Equipment to Produce Various Types of Fuel Including Fuel Made from Coal, Conditions and Factors which Affect Part Throttle Fuel Consumption, the Value of Dual-Fuels and Methods of Obtaining Better Mileage from Present-day Fuel are Presented Here.

super-octane fuel — certainly No. 1 is the most important, and for future security No. 2 should be considered next, and No. 3 should be considered last.

Mr. Holaday presses the point that more inherent anti-detonation can be built into engines than is now being considered and further points out that determination of fuel performance is usually made at full throttle, and he feels that better results could be obtained if we concentrated on analysis of fuel use at part throttle. However, these are two separate considerations, full throttle is measured in hill climb and acceleration while part throttle is measured in fuel consumption. Almost everything that is done in the present engine for improving part throttle fuel consumption will result in trouble for full throttle operation. We have compensated in vehicles for this adversity particularly by the vacuum spark advance and the automatic heat cut-off to manifolds for full throttle. We have much more to do along these lines, the most important being making the full throttle operation immune from detonations without using special, and as yet in quantity, unavailable fuel.

Unfortunately part throttle fuel consumption, which is the true reflection of tank mileage, depends on many factors not reached by present day thermal calculations. The leanest mixture that will burn for the highest miles per gallon controls the part throttle fuel consumption and depends on items that have nothing whatsoever to do with relative thermal values.

Fig. 7 gives an indication of the possible exploitation of burning lean mixtures without missing with regular gasoline, vintage 1935, in the U. S. This curve, taken from AUTOMOTIVE INDUSTRIES, December 15, 1946, was part of a paper for the I.A.E. in 1938. As yet we have failed to see an awakening to its significance.



There is a direct gain in thermal efficiency with lean mixtures due to the fact that very little of the live fuel is lost due to its not being "found" by the air. There is so much air present that complete combustion, assuming a good start of inflammation, is part of the lean mixture process. Further the ratio of heat loss to the walls is quite different than with full throttle since the temperature difference between the burning charge of

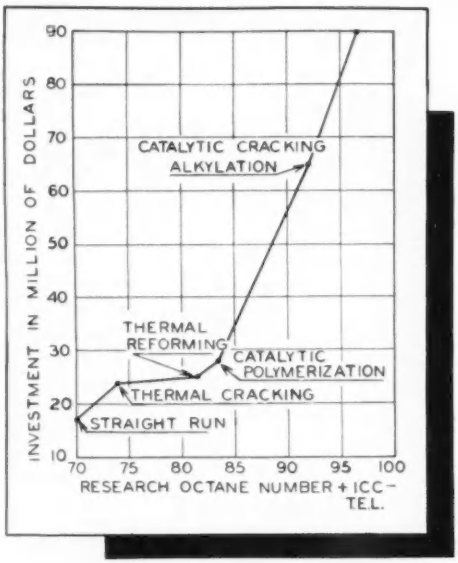


Fig. 6 Investment for 100 000 bbl per day refinery (from SAE Journal May, 1948—Holaday).

lean mixture to cooling walls is much lower than with a full throttle charge. The rich mixture characteristic of full throttle mixture is one way of lowering this temperature difference for full throttle, but a very undesirable way indeed.

Modern transmissions that permit the lowest engine rpm per mile per hour are good. However, the wrong spark plug, or setting, or position, can offset this quite easily. This phase of fuel utilization represents a level of work that is yet to be undertaken seriously. There is much to learn about burning lean mixtures.

In 1936 this author, when working in England, was utilizing 18 to 19 to 1 mixture ratios in engines of 10 and 12 rated hp, but in the truck engines of the same company we did not do better than 16 to 1 mixture ratio. We did not try very hard. In the U. S. part throttle mixture ratios vary from 15 to 17 to 1. Recently an F-head engine was produced in England for which mixture ratio claims of 21 to 1 are being made.

The engine designer can improve his ability to burn lean mixtures and eventually the fuel maker must improve the burnability of his fuel at lean mixtures. Increasing the compression ratio reduces the quantity required of fuel for performance by better thermal conversion and increases the ability to burn lean mixtures at part throttle. Hence we do not argue against the fuel economy advantage of using high compression ratios, but do argue against the necessity of special fuels for this ratio.

For best part throttle performance we should like a constant compression pressure, but we want it with the utmost flexibility and that is why this feature has been slow in its arrival for public use.

Present day engines depend on a degree of internal cooling. We know that normally we can consider 14 to 1 mixture ratio as the approximate par for full throttle, yet we know our engines require 11 to 12.5 to 1 for actual full throttle road mixture ratios. The additional fuel is the percentage required for internal cooling of different engines. Quite often a detonating present day engine represents a reluctance to provide adequate internal cooling by fuel at full throttle and sometimes it is lean individual cylinders. This condition of relative internal cooling between the full and part throttle operation represents the area of attack for the alcohol-water injection programs such as the Thompson Vitameter (see Jan. 15, 1948, page 32, Automotive Industries) and also the dual-fuel carburetor, with one fuel for part throttle and one for full throttle. Both of these methods would permit a higher useful compression ratio which would permit more effective part throttle operation by subduing full throttle detonation. However, both depend on auxiliary fuel supplies and the distribution of the auxiliary fuel. In both cases if the engine was tuned to take advantage of this full throttle assistance there would be trouble if the auxiliary fuel ran out where the supply did not exist.

There can be no question as to the interim value of dual fuels, one to give maximum fuel economy through lean mixtures at part throttle, the other to act as an internal coolant. The quarrel comes in the decision of the means of supplying the internal coolant and what should constitute the coolant.

It is fair to assume that our ability to burn lean mixtures at part throttle may grow and 19 to 1 mixture ratios will be common practice. We know from thermal analysis that 14 to 1 is roughly par for full throttle. Then the available gain at present allowable compression ratios is: Full throttle 12.0 to 14 to 1, gain—16 per cent; part throttle 17 to 1 to 19 to 1, gain—11 per cent.

The sixteen per cent full throttle gain can be obtained by: (a) Higher octane fuel for full and part throttle; (b) Higher octane fuel for full throttle only; or (c) Water-alcohol injection.

The sixteen per cent gain in full throttle consumption with (a), (b), and (c) is available only when full throttle is used and that is for passenger cars 10 per cent of the time and trucks 35 to 40 per cent of the time, and hence will affect the overall fuel consumption less than 1.6 per cent for passenger cars and less than 7 per cent for trucks.

If, as the result of suppressing full throttle overheating, we can attack the part throttle and we are able to burn effectively 19 to 1 mixture ratio at car driving loads below three-quarter throttle then we gain 11 per cent for ninety per cent of the time for passenger cars and 60 per cent of the time for trucks. This represents 10 per cent fuel consumption gain for passenger cars and 7 per cent approximately for trucks. This should be profit for the user, but will it?

Total savings would be about 12.5 per cent average for vehicles generally, just about enough to offset the cost of doing it chemically, but without gain for the user. It would thus seem that Mr. Holaday is right, however, in insisting more consideration be given to part throttle fuel burning processes. There are three

High Compression Without High Octane Fuel

areas of attack to obtain more effective part throttle operation: (a) Improvement in ability to burn leaner mixtures; (b) Improvement in burnability of lean mixtures; and (c) Increase in compression ratio. Of these, (a) is a series of problems within the horizon of opportunity by the engine designer, (b) is a series of problems within the range of opportunity of the fuel maker, and (c) is a group of problems that must be a combined effort of fuel producer and engine man, but mostly by far by the engine man. We would prefer to eliminate the fuel producer and the chemist from this problem for a year or two and let the engine man do his best with it, which according to available information is considerable.

There are three areas of attack to obtain more effective full throttle operation. These are dual fuels which may be alcohol-water injected at full throttle only or high octane fuel injected at full throttle only; a larger engine using retarded spark for full throttle and throttled intake valve; and an increase in compression ratio without increasing temperature of last gas to burn.

Alcohol-water injection is a series of problems within the realm of cooperation of accessory maker and car engineer. The injection of high octane fuel at full throttle only is more difficult to accomplish since it requires a carburetor with dual float chambers and is not likely to attract the engineers responsible for cars that used to be, and may be again, in the low-priced bracket. However, this can be done with the Thompson Vitameter, also with the cooperation of the accessory maker and engine designer.

Larger engines are beginning to show up all over the world. The European engines are likely to average between two and three liters, but then they have been too small in the past. The American engine has always been large, not too large, but big enough to do a first rate job of acceleration and hill climbing. Usually the power loss for maximum torque without detonation is around four per cent below 1600 rpm, around two per cent up to 2500 rpm, and zero above this speed.

Increasing our engine size 10 per cent would permit operation at present power levels without detonation. A 10 per cent larger engine would also extend the range of usefulness of part throttle giving some overall gain in fuel economy. However, human nature being what it is, our engineers would rather die than produce a 10 per cent larger engine that produced no more acceleration and hill climbing ability than an old smaller one. No one would spend the money on tools for such an engine.

Yet this is the only rational means of saving the L-head engine, assuming any manufacturer would invest in new tools for an L-head. There is one real possibility for such an engine, and that is in the flat or pancake type, where the L-head would save eight in. of width. Assuming we wished to replace a 220 cu in., 85 hp, in-line engine, 6.75 compression ratio with a flat engine, a rational design would be, 245 cu in. 7.75 to 1 compression ratio with intake valves $1\frac{1}{2}$ in. or less in diameter. This could give present performance without detonation and with improved fuel consumption.

With reference to raising the compression ratio without increasing the temperature of the last gas to burn, this would be considered an ideal answer to engine progress. Detonation, occurring as it does at the last gas to burn in the combustion chamber, is affected by almost everything that happens to the mixture from the carburetor to the point of detonation. Poor mixture distribution among cylinders puts too much internal cooling in some cylinders and not enough in others. This distribution variation in good engines has been stabilized at this time at about seven per cent variation among cylinders at full throttle and no variation among cylinders at part throttle. Some engines are not as good as this.

We believe that more work is required by the fuel people to evaluate the relative "surface tension" of different blends and determine to what extent this characteristic of fuel affects mixture distribution among cylinders.

We do know that the difference between alcohol and gasoline in surface tension will make an excellent gasoline manifold operate as an impossible alcohol manifold.

There seems to be little evidence of recent work in trying to pick up this variation among cylinders. Seven per cent is not much, but it may be important when new engines are being considered.

A pertinent thought enters at this point. When using alcohol and water injection for full throttle detonation suppression in vehicle engines it would be well to restudy the intake manifolds in order to obtain the best results. Many manifolds today include corrections for wet gasoline mixtures, which corrections are the reverse of what is required for a wet alcohol

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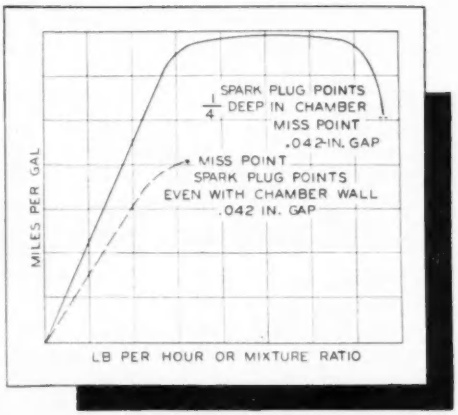


Fig. 7 Relative fuel consumption opportunity.

AIRBRIEFS

By ROBERT McLARREN

Cure Worse Than Cause

The toughest requirement a commercial airliner must meet is to have the ability to pull out of an airport after one engine has failed on takeoff. Most of the postwar, high-wing loading transports have met this requirement by the use of automatic propeller feathering equipment, which eliminates the substantial drag of a wind-milling propeller by turning its blades to the feather position quickly. Because the affair may be nip-and-tuck, the automatic feathering device is used in order to reduce pilot "thinking" and acting time to a minimum. The equipment is designed to feather the propeller whenever the torque pressure (engine power) falls below a certain preset value.

The system is intelligent and efficacious but like most automatic systems, it was designed on the basis of certain assumptions which overlooked one small practical possibility: a momentary loss of power due to backfiring, etc. One of the causes of such backfiring is faulty metering of water-injection equipment but there are countless others. Some weeks ago an airliner suddenly feathered a propeller when the engine backfired on final approach. More recently, the same thing happened following a takeoff. In both cases no lives were lost but this is another prime example of what the engineer is up against, sitting at his board attempting to visualize everything that could possibly happen to his device. Some engineers suggest a manual over-ride, others a disconnect switch to isolate the circuit on takeoff and landing, which puts us right back where we started! Automatic controls are the only solution to the problem of growing pilot load, yet the pilots themselves favor manual control of everything for emergency use, thus increasing their load!

Public Preference

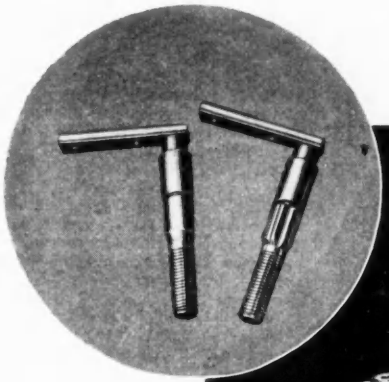
Most U. S. engineers regard the turboprop engine as an interim type for which there is no interim. Rapid reduction in specific fuel consumption of the turbojet engine plus its many other advantages is closing the gap between itself and the reciprocating engine so fast that most designers in this country see little point in expending time and effort on the turboprop since the turbojet will be here so quickly. The British see the situation quite the other way around, viz: the turbojet is so far off that the turboprop is sure to fulfill many years of useful service, perhaps well into the period when the turbojet is competitive on the basis of fuel consumption. This makes for an interesting technical debate but G. R. Edwards, Vickers-Armstrong chief designer, struck a solid blow at the joint I.A.S.-R.Ae.S. Second International Conference the other day. He said: "If the air traveler chooses to travel in turbine aircraft to the exclusion of all other types when he has the choice, that factor must outweigh all others. He will turn his back on what he now accepts as first-class air travel." That remark bears sound study. U. S. engineers have felt that the British have every right to "go turbine" while the U. S. airliner sticks with the piston engine and never the twain shall meet. But Edwards has introduced an entirely new note by indicating that the passenger may well go his way instead of ours. The lack of noise and vibration in the turbine-engined aircraft is certain to attract passenger preference. When it does, U. S. piston-engined liners may be flying the Atlantic empty watching BOAC's turbine-engined aircraft carry all the business! But, then, the turbojet is a turbine-engine, too!

Valve-less Valve

When the U. S. Bureau of Standards introduced its magnetic clutch, the aviation industry took no more than a passing interest in it. The Bureau has continued to extend the application of its magnetic fluid, however, and has now come up with an idea that has perked up many ears in the aircraft business. The idea is the use of magnetic (suspended iron particles) fluid in a hydraulic system which could be controlled by a simple coil placed around a hydraulic line at any desired point in the system. Energizing this coil brings the fluid within the pipe to a halt or restricts its flow to any desired rate. This application would greatly simplify the problem of remote control of sub-systems remote from the cockpit to which only wiring need be routed, instead of remote-operated selector valves, etc.

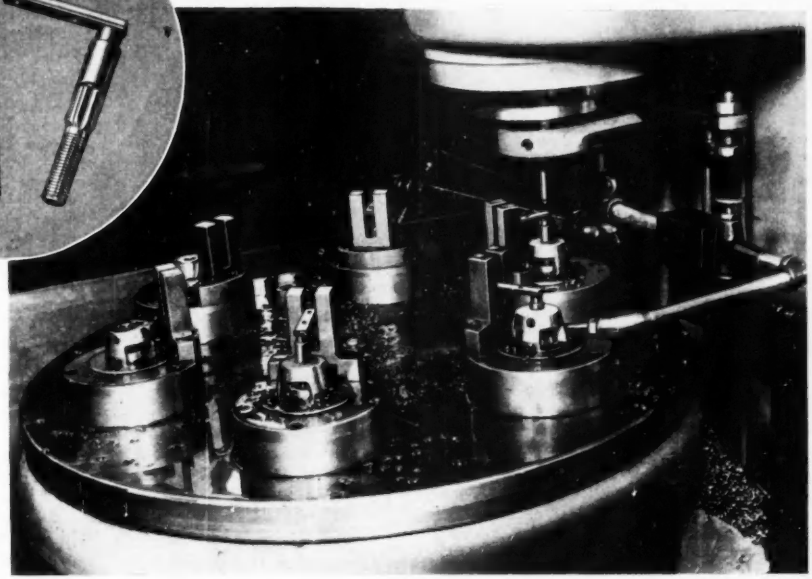
Military Plane Orders

The question of the hour in the airframe industry is the Air Force procurement program for fiscal 1950. It now appears highly unlikely that USAF will publicize its purchases to the extent familiar in former years but there are strong indications as to the buying pattern for this new year. More Convair B-36 bombers will be bought, probably 75 or 80, which crystallizes the firm conviction of the Air Force that controversy or no controversy, this is the major Air Force weapon now and in the future. But the six-jet Boeing B-47 will be a substantial production item for the next few years with an initial quantity of nearly a hundred. Air Force plans heavy jet fighter purchases with the Northrop F-89, McDonnell F-88 and the new Lockheed F-90 sharing the income. The Northrop twin-jet all-weather fighter is already in production but about three times the present quantity will be needed. The F-88 will be McDonnell's first Air Force production award but it will be a thumping one. The razor-sharp, swept-wing F-90 has just made its first test flight but Air Force seems perfectly willing to bank on Lockheed's jet fighter design and production soundness. Transports will be divided between the huge Douglas C-124 Liftmaster and the Boeing C-97 Stratocruiser, both of which are already in production. More Fairchild Packets seem assured and a newcomer will be the Chase twin-engine Avitruc light assault transport. These will be accompanied by the usual light orders for helicopters and rescue aircraft. This procurement lineup characterizes the Air Force plan as a thoroughly independent long-range striking force with an equally strong home defense echelon. But it leaves one gaping hole that may well cause the Air Force both tactical and political trouble: bypassing of Ground Forces cooperation types. One of the highly romanticised concepts generated by World War II was the "air borne army" closely supported by low-flying aircraft. Politically, the Air Force runs the risk of alienating the ground force member of the Joint Chiefs of Staff and thereby breaking up its present winning combination of 2-1 against the Navy.



The auto window crank assembly at left is ready to be broached. The one at right shows splines in the shaft after broaching is completed.

Close-up of the HydrOlLic index table on a six-ton Denison Multipress showing the six-station tooling set-up for broaching auto window crankshafts. Parts loaded into fixtures at front of the table are automatically indexed to the ram station for broaching, then thrust from the fixture by a knockout cam while a blast of air cleans the die and parts.



High Speed Automatic Broaching

BY means of improved equipment, the Pivot Manufacturing Co. of Detroit is broaching splines on automobile window regulator crank shafts at the rate of 1500 per hour. In addition to this high output, the company reports easier processing for the complete window crank assembly. The machine employed is a Denison oil-hydraulic Multipress equipped with an automatic indexing table.

The part being broached in this instance is a shaft used to regulate the quarter windows of automobiles. The operation consists of broaching a $\frac{3}{8}$ in., 2B spline, approximately $\frac{5}{8}$ in. long in SAE 1112 steel. The shaft is threaded at one end, and has a small piece of flat steel welded to the other end, forming a crank. Formerly this broaching operation was performed on a punch press which had to be geared slow enough to avoid tearing the steel shafts. The entire shaft was pressed through the broach and dropped beneath the press. This made it necessary to weld the cross member to the shaft after broaching. Not only did this incur scrap loss after the shaft was broached, but also it made necessary the restraightening of some shafts. By the present method with hydraulic power, the shaft and cross member are welded together beforehand, broaching is of improved quality, and the crank is ready for assembly upon completion of this operation.

In this high-speed broaching, the fixtures at each of six stations on the hydraulic index table are automatically positioned in sequence beneath the Multipress ram. The operator loads the parts in the fixture at front of the table, with the flat steel bracket of the crank held between guide rails. The table indexes the loaded fixture to the pressing station and the ram descends, pushing the shaft down into the broaching dies. A constant flow of oil is maintained on the part as broaching takes place. This oil drains to a splash pan beneath the index table. It passes through a sump, is cleaned and used again to lubricate the cutting dies.

After the shaft is broached, the part is indexed to the ejection station where it is thrust from the fixture by a knockout cam. A blast of air cleans chips from the broach, and the fixture is ready for reloading.

OBSERVATIONS

By JOSEPH GESCHELIN

Vee Six

Whether or not founded on fact, rumors persist as to the development of a V-6 engine for passenger cars. It's a repetition of rumors current a year ago. Just in case you may have overlooked it, we suggest you refer to the article in AUTOMOTIVE INDUSTRIES, Aug. 15, 1948, dealing with an analysis of V-6 engines. One point made by P. M. Heldt is that it appears almost impossible to eliminate rocking couples. Perhaps some one has found the solution to this classical drawback.

Light Cars

Although J. R. Davis, Ford sales manager, explained recently that it is beyond practicality to build a car for $1000 today, trade circles continue to buzz about light car developments in the offing. Most motor car producers have been probing small car designs and some could be ready to meet competition pretty quickly. Just the same it would be futile to expend the time and effort and particularly the investment in a light car unless there were reasonable assurance that it could be sold for around $1000.

Cooling Riders

One of our friends inquired recently why motor car producers do not supply full air conditioning at least on more expensive models. It's a good question as any one who does a lot of driving in summer months can testify. Before the war Packard was practically the only manufacturer of record to equip cars with air conditioning. At the time the installation was quite expensive. Isn't it reasonable to assume that some major producer in the refrigeration field can turn up a motor car unit of light weight and adequate capacity at a reasonable figure—say around the cost of a small refrigerator?

Power Steer

For some time there has been discussion of power steering for passenger cars. This sounded far fetched considering the high cost of such equipment up to now. Yet we understand that power steering is very much in the cards at this writing. It is intended for larger cars at the moment but it is felt that cost would not be too high later for consideration on even less expensive models.

Sleeve Standards

It was an eye-opener to visit one of the major producers of cylinder sleeves and learn something of the variations in practice required by engine builders. One would expect differences in size and form, but in addition to bore size, there is the specification for tolerance on the bore, on taper, on out-of-roundness, and wall thickness. The situation is made even more complicated by differences in surface finish, ranging from mirror finish to 25 micro-inches or more. Each job requires honing stones of different grit and some entail the use of stones of differing grit size for the same set up. To meet the situation the sleeve producer must carry an enormous stock of honing stones. Perhaps there is an opportunity to effect some simplification of practice through a standardization committee. Anything constructive along this line should result in manufacturing economies for all concerned.

Aluminum Heads

The paper on aluminum cylinder heads at the SAE Summer Meeting gave evidence that corrosion can be controlled by simple means. For one thing recent investigations indicate that the composition and heat treatment of castings play a major role. Obviously, these factors can be readily controlled. Erosion of water inlet ports also can be reduced, if not eliminated, by the use of protective type cylinder head gaskets. The paper gives evidence that engine builders can safely resume the use of aluminum heads, if they so desire.

Smoke and Smell

We have mentioned on occasion the need for controlling smoke in Diesel engine exhaust. Many heavy duty vehicles now on the highways are prime offenders and unless this situation is corrected speedily restrictive legislation is sure to come the country over. Noxious exhaust is easily as offensive and perhaps more so on city streets. Just how bad this is can be appreciated by driving behind city buses, say around Detroit for example.

Grade Ability

A source of discussion around the clock is the gradeability of heavy duty motor trucks. If you have driven on hills and on mountain roads behind a laden truck, you will understand why. At the Summer Meeting it was demonstrated that existing formulas for gradeability result in specifying engines of fantastic output just to meet some reasonable speed requirement on grades. There is now a feeling in governmental circles that the answer does not lie in bigger engines. It lies in the development of three lane highways on grades, permitting passenger cars to pass freely in the center lane.

Grinding Progress

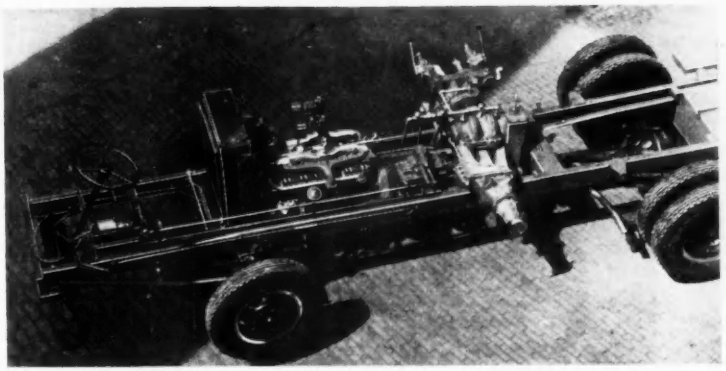
A recent session on grinding problems brought out an interesting observation by E. J. Abbott. He has found that finer finishes result with the use of coarser grain grinding wheels in softer grades. In some respects this is just the reverse of popular conception. But he is prepared to prove his point. The problem of grinding checks on fine finishes is still with us and the use of the proper type of grinding oil remains one of the best solutions.

Engine Progress

The SAE Summer Meeting provided a forum for viewing future developments in power plants. Despite a somewhat discouraging appraisal of the gas turbine, the future course of this powerplant cannot be discounted as a competitor to the reciprocating engine for road vehicles. Another important competitor is the compound engine. Here the development is taking two distinct courses—the free piston engine; and an adaptation of conventional Diesel engines with a turbo-charger. It is evident too that gasoline engine progress is taking two divergent courses. Although there is a trend to the high compression engine, dependent upon fuels of exceptionally high octane ratings, another school has veered to mechanical octanes.

Electroplate Corrosion

An important study on corrosion reported by the Battelle Memorial Institute brings out two points of interest in its initial phases. The first is that the decorative life of any nickel-chromium or copper-nickel-chromium plate on steel depends upon the nature of the atmosphere to which it is exposed. This is an uncontrollable factor. The second conclusion is that the thickness of nickel is the determining factor in the life of a decorative coating.



View of pumper chassis showing compact arrangement of operating units.

By S. K. Wolcott, Jr.

Engineer in Charge, Engines and Pumps, American-LaFrance-Foamite Corp.

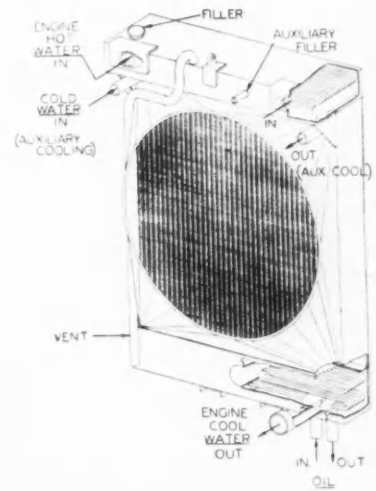
New Fire-Fighting Apparatus Features Cab-Ahead-of-Engine

MAXIMUM accessibility of all units is achieved in American-LaFrance-Foamite Corporation's new 700 Series pumper. The cab-ahead-of-engine design, with the driver in front like the modern bus, is more maneuverable in traffic and the driver has a greater angle of vision for safer operation in traffic, also easier spotting of the pumper for hydrant or draft operation. The short wheelbase of 150 in. permits a new ease of handling through narrow and congested streets.

The major chassis units are located between the axles to give a weight distribution of approximately 45 per cent front and 55 per cent rear, also this well balanced weight distribution results in good roadability on slippery or dry pavements. The braking system used on this fire apparatus is of the Hydrovac type, the brakes being balanced between front and rear wheels for maximum braking, hence minimum stopping distance. (*Turn to page* 78, *please*)

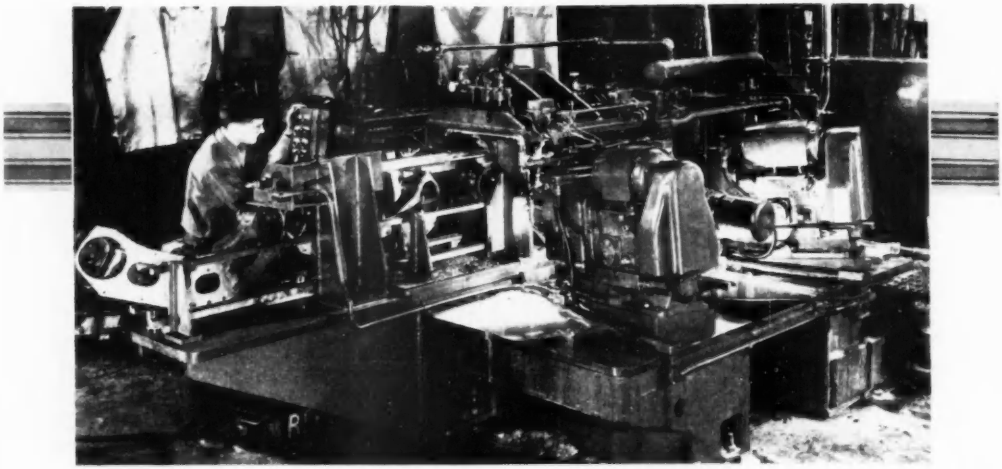
Condensed Specifications for 750 Gallon Pumper

Wheelbase	150 in.
Overall length	296 in.
Overall width	93 in.
Turning radius	25 ft
Brakes	Hydrovac power operated hydraulic
Final drive	Hypoid
Transmission	Selective gear with overdrive
Clutch	Single plate, dry, heavy duty
Engine	
No. of cyls	12
Angle of vee	45 deg
Bore	3.625 in.
Stroke	4.25
Piston displacement	526 cu in.
Horsepower @ 3550 rpm	190
Compression ratio	7 to 1
Ignition	twin
No. of main bearings	4



This sketch illustrates the unique arrangement of intercoolers.

New cab-ahead-of-engine 700 series pumper.



View of W. F. & John Barnes transfer through machine installed at A. O. Smith for drilling and tapping control arm holes in front cross-members. The loading station is at the left, followed by the drilling station and tapping station, with unloading at the extreme right.

Special Machine for

Drilling and Tapping Cross Members

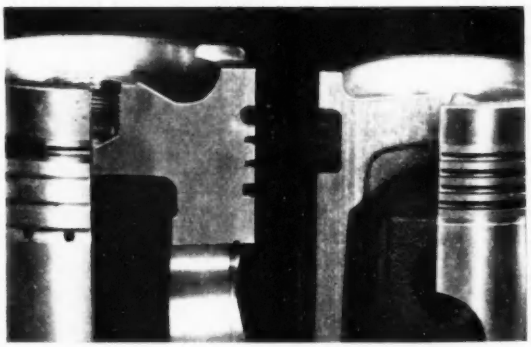
AN unusual example of the application of automatic methods for the machining of large and unwieldy parts with locating surfaces at odd angles is found at A. O. Smith Corp., Milwaukee, Wisc., in the drilling and tapping of passenger car frame front cross-members. These members are composed of welded steel stampings and requires drilling and tapping of control arm attachment holes for the front suspension.

The machine illustrated here is a special progress-through unit of four-station design, supplied by W. F. & John Barnes. With the automatic cycle, approximately three assemblies per minute are completed. The four stations consist of—loading, drilling, tapping, and unloading positions, with the part automatically indexed by air powered fingers. The drilling station has four, four-spindle multiple heads, two driven by 7.5 hp motors, the other two having a three hp drive. The tapping station has two, four-spindle multiple heads driven by a five hp motor.

Drill heads are hydraulically actuated for rapid traverse and feed, each unit being individually controlled. Tapping heads are of master lead screw type, spring loaded for tool safety. Air operated dowels and wedges are employed for locating and clamping the part in each work station. Dowel pins, automatically inserted in the work, assure correct alignment for each operation, thereby providing a self-checking set-up.

During the work cycle the transfer bar—used for moving the work from station to station—automatically returns, thus setting up the transfer mechanism for loading the next part and for completing the next transfer cycle.

Aluminum Piston with Iron Ring Lands



Fairchild Engine and Airplane Corp. has licensed the United Engine and Machine Co., San Leandro, Calif., to use the Al-Fin process of bonding aluminum to steel in manufacturing a bi-metallic piston of unusual design. The new piston of aluminum alloy employs a band of nickel alloy iron to reduce ring land wear. This construction, in which the iron is bonded to the aluminum, is said to provide exceptionally long life and virtually eliminate top ring breakage. Several different designs are offered, two of which are shown in the above illustration.

NEW Production and Plant EQUIPMENT

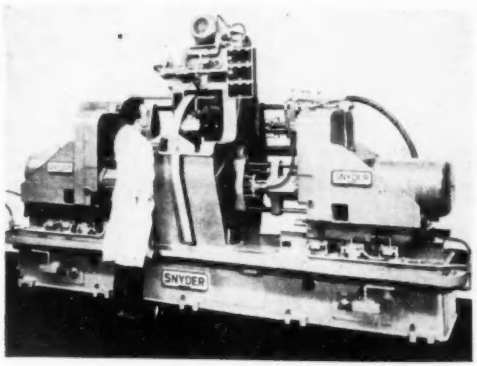
For additional information regarding any of these items, please use coupon on page 54

E-8—Machine for Transmission Parts

A new automatic cycle machine for drilling, counter-sinking, rough boring and semi-finish reaming automotive transmission parts is announced by Snyder Tool & Engineering Co., Detroit, Mich.

The work piece is a transmission planet carrier and parking lock gear assembly and is located and clamped in special, air-operated, diaphragm chucks. A hydraulically operated pressure plate is provided at the drilling station to support the part and chuck against drill pressure.

The machine is equipped with a Snyder, four station, Geneva operated trunnion. On the right side of the trunnion is an eighteen spindle multiple drill head with one master head carrying three 6-spindle pot heads. Each pot head has its own bushing plate.



Snyder automatic cycle machine for operations on automotive transmission parts

On the left side of the trunnion is a 6-spindle head, also with a master head but with a single 6-spindle pot head. Two dummy heads mounted on this master head are used to carry spring loading bushing plates to pilot the line boring and reaming tools. Heads are mounted on Snyder standard hydraulically operated, way type, slide units.

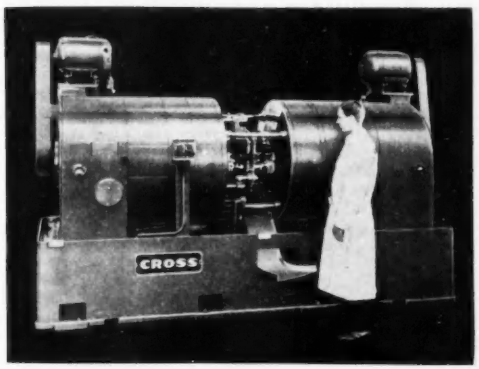
After loading and unloading at Station 1, the machine automatically indexes to Station 2 where the left and right heads each drill and countersink six holes. At Station 3 the left head advances the bushing plate to the pilot line boring bar and the right hand head rough bores six holes. At Station 4 the left head advances the bushing plate to the pilot line reamer and the right hand head semi-finish reams the six holes. Work cycle is automatic and the machine can be operated by unskilled help.

Tools are high speed steel running at 70 sfm. Stroke is 0.008 per revolution. The right hand head is powered by one 10 hp motor, the left hand head by one 5 hp motor and the Geneva index by one 2 hp motor. Hydraulic and coolant are housed in separate tanks at the rear of the machine. The base is welded steel construction, ribbed and thoroughly normalized for rigidity. Floor space required is 81 in. by 174 in. Production rate is 75 cycles an hr at 80 per cent efficiency.

E-9—Connecting Rod Chamfering Machine

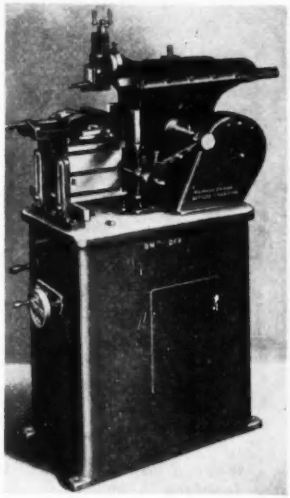
Chamfering connecting rods at the rate of 1,000 pieces per hr with only one operator is made possible by a new special machine tool created and produced by the Cross Co., Detroit, Mich. The machine is designed for maximum automaticity. The operator, paced by the continuous automatic cycle, merely loads the parts and presses the cycle button. Unloading onto an automation conveyor for the next operation is accomplished automatically.

Quality of output is assured by tool heads which align the work from the main bore for perfect concentricity and by single point carbide tools to generate the chamfers. Other features include complete cam operation and safety clutches for protection against improper loading and off-size parts.



Cross machine for chamfering connecting rods

E-10—Six-Feed Automatic Shaper



Logan 8-in. shaper

An 8-in. shaper of advanced design is now in production at Logan Engineering Co., Chicago, Ill., having a powerful 8½ in. maximum stroke for straight cuts, angular cuts, squaring, machining, and slotting.

The shaper provides six automatic

feeds in either direction, from 0.002 in. to 0.012 in., which are set by a feed dial with readings graduated to 0.001 in. A half turn of the feed handle in either direction reverses the feed. Any speed from 35 to 180 strokes per minute is obtainable, and speed changes are effected instantly by turning a hand wheel control. The table, 8 in. wide by 8 in. long, has a vertical travel of 5½ in. and a 10½ in. traverse. Because the tool head may be swiveled 360 deg, squaring the ends of stock of almost any length is possible.

NEW Production and Plant EQUIPMENT

For additional information regarding any of these items, please use coupon on page 54

E-11—Knee-Type Milling Machine

Kearney & Trecker knee-type milling machine

A new line of knee type milling machines featuring a built-in chucking table to simplify handling of irregularly shaped workpieces without special tooling and fixtures is announced by Kearney & Trecker Corp., Milwaukee, Wis. With certain simplified vise jaws and standard setup accessories this one-piece cast table at once provides the suitable chucking mechanisms.

Twenty-four chucking table milling machines are available in plain or vertical styles, with or without automatic cycle mono-lever table control. Offered in two sizes—No. 4 and No. 5 having 42 in. and 50 in. power table travel respectively — power capacities range from 20 to 50 hp.

Features include a deep well coolant drain that provides fast clean return and keeps the tool area free from oil and coolant borne chips; self-cleaning stop holes ready for bumper stops when the setup requires; longitudinal T-slots for positive alignment of jaw bases and jacks, and a standard 13/16 in. center T-slot to accommodate vises, rotary tables, etc. Transverse T-slots are five in number, spaced to best accommodate both large and small workpieces. Mono-lever table control simplifies feed and rapid traverse.

Chucking table accessories include the master jaw bases, consisting of two large T-nut units connected by a right and left hand screw, the end of which is squared to take a crank handle. These master jaw bases fit both the longitudinal and transverse table T-slots.

Three types of vise jaws mount on the master jaw bases to form the chucking mechanism: 1) Smooth universal reversible jaws having three gripping surfaces are the most suitable for operations located from finished surfaces. A slot and tapped holes in the front face provide for mounting special hard or soft jaw inserts. 2) Serrated universal reversible jaws having three curved gripping surfaces—two on one side, one on the other—are suitable for rough castings or forgings. 3) Vise jaw blanks, rectangular in shape, are machinable by the customer to meet specific requirements.

Other workholding and locating accessories include an adjustable spring loaded screw jack and a plain screw jack for mounting in the large transverse and longitudinal table T-slots, and a smaller plain screw jack for use in the small longitudinal table T-slot. Bumper stops for end location and a crank handle for moving the vise jaws is provided.

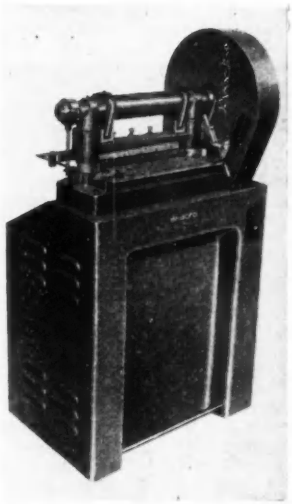
E-12—High Speed Power Shear

The new Di-Acro power shear placed on the market by the O'Neil-Irwin Mfg. Co., Lake City, Minn., is designed for close tolerance high speed production shearing. It cuts square, rectangular or other straight sided blanks, shears extremely narrow strips and trims edges of sheets or parts, from the lightest of materials in plastics, fiber, mica, leather and rubber to heavy gages of aluminum, cobalt steel, chrome molybdenum, leaded brass, stainless steel and many spring tempered materials. A clean cut free from rough edges or burr is said to be assured.

A knee hole in the front of the cabinet provides comfort for the operator and allows close observation of the work. A protracting gage for squaring and mitering is supplied. Numerous tapped holes are provided for universally locating this gage in any desired position on the shear table.

The precision material length gages provided can be quickly mounted either in front of the shear for accurate trimming of parts or in back for precision sizing of stock. This length gage and the protracting gage so complement each other that infinite precision can be obtained in parts sheared to unusual angles and shapes. A gravity chute for delivery of all sheared materials into a receptacle is placed in back of the cabinet.

The shear is operated by a non-repeating positive action clutch, controlled by the operator's choice of either the foot bar or hand lever. The safety clutch can only be positively engaged by a deliberate intent of the operator. A combination blade guard and adjustable hold-down bar prevents the material from tipping.



Di-Acro power shear offered by O'Neil-Irwin Mfg. Co.

Inland, too, Blends Ingredients ...for Steel to Fit *Your* Needs

Just as the judicious chef blends his sauce to suit the individual tastes of his patrons . . . Inland prepares steel to meet the specific requirements of its customers. Being an independent and completely integrated company, Inland is in a position to render this service . . . to furnish *job-fitted* steel for your needs . . . and to act quickly when fast action is necessary. What's more, at Inland, your orders for steel—as well as your steel problems—are treated with friendly, personal interest. Through each phase of production, *your* steel is checked and rechecked to insure its absolute conformance to your specifications.

INLAND STEEL CO., 38 S. Dearborn St., Chicago 3, Ill. Sales Offices: Chicago, Davenport, Detroit, Indianapolis, Kansas City, Milwaukee, New York, St. Louis, and St. Paul.

INLAND STEEL

BARS • STRUCTURALS • PLATES
SHEETS • STRIP • TIN PLATE
FLOOR PLATE • PILING • RAILS
TRACK ACCESSORIES

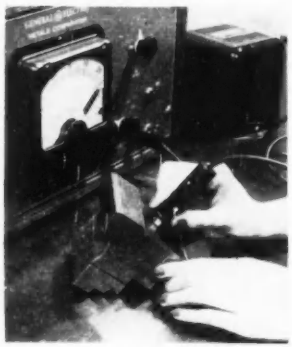
. . . and
This "Inland Team"
Gives Your Steel
Their Personal Attention

METALLURGY SALES OPERATIONS

F-13—Automatic Primary Wire

Flexstrand, a new type automotive primary wire, has been put in production by the Electric Auto-Lite Co., Toledo, Ohio. This new product of the Wire and Cable Division of the company features additional strands of wire, in some cases more than four times as many strands, and special lacquer treatment for improved waterproofing. The added strands make the wire more flexible, easier to handle, and better able to withstand vibration. Flexstrand, a feature of the new Auto-Lite Silver Line of automotive wire and cable, is recommended for all automotive lighting systems and other forms of primary wiring in the motor car.

F-14—Test Head for Metals Comparator



G-E test head for General Electric's metal comparator

Greater application and wider utility is provided for the G-E metals comparator by a new comparator test head announced by General Electric's Special Products Division, Schenectady, N. Y., for use on flat surfaces, particularly on large specimens like forgings and machine tool beds where the conventional test unit, the test coil, is inapplicable.

Employed in the automotive, aircraft, machine tool and die industries in comparing ferrous or non-ferrous metal parts with a known standard, the comparator provides a quick, non-destructive test of the quality of the parts for maintaining close control on composition, heat treatment, or hardness characteristics.

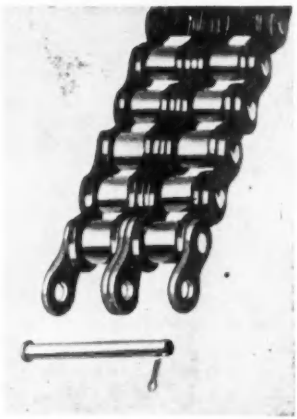
The metals comparator is basically an impedance comparator. The impedance of a test unit will vary with the electrical and magnetic properties of the specimen being tested. Through use of standard or reference specimens changes in the chemical and physical properties are correlated with the electrical and magnetic properties.

The comparator equipment consists of an electronic unit mounted in a steel cabinet and a test unit—either a coil for small metal parts or the new test head. The electronic unit includes a balancing network, oscillator, and indicator. It operates on single-phase, 60-cycle, 110-volt commercial supply. The contact face of the new head consists of a ring separated from a concentric core by an air gap, thereby forming a radial magnetic path across which the test piece is placed. It is 3 in. long, supplied in various face diameters.

NEW ★ PRODUCTS

For additional information regarding any of these items, please use coupon on page 54

F-15—Roller Chain Connecting Pin



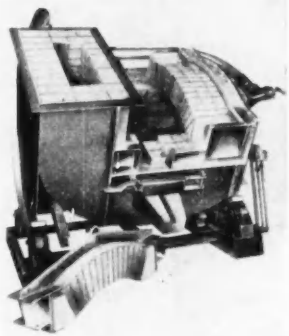
Single connecting pin design adopted by Morse Chain Co., Division of Borg-Warner Corp., Detroit, Mich., for their series DRC stock double roller chain couplings. Single connecting pin design increases ease of assembling or disassembling roller chain couplings. These DRC roller chain couplings are made in 7 sizes ranging in capacity from 2.7 to 97 O.H.P. per 100 rpm, in a wide range of finished bores.

F-16—Rubber Hydraulic Control Hose

A new use for rubber hydraulic control hose on large Diesel powered trucks is reported by The B. F. Goodrich Co., Akron, Ohio. Hose manufactured by the company is being used on the fuel injection systems of the Diesels, replacing copper or flexible metallic tubing ordinarily used, which is said to often break off behind the couplings, caused by vibration. The rubber hose is made to resist the action of the Diesel fuels.

F-17—Reverberatory Tilting Furnace

Reverberatory tilting furnaces of the Sklenar type for the melting of ferrous and non-ferrous metals, brass, aluminum and other alloys, with capacities of 350 to 20,000 lb and capable of producing from 13 to 21 melts per day, are a product of Bellevue Industrial Furnace Co., Detroit, Mich. They are self-contained units fired with oil or gas and the draught is supplied by a blower that is a part of the furnace. The metal is charged through a hopper which is also the exhaust from the combustion chamber. The metal is preheated and melted in suspension in the hopper and trickles down into the metal bed, assuring no cold metal ever reaching the molten bath. It is not necessary to shut off the flame to charge additional metal—continuous charging is practical for melting borings, spillage, and metal in most any form, including ingot metal.



Bellevue Sklenar type reverberatory tilting furnace

The combustion chamber is heated by the same fuel as is used to melt the metal in the hopper which tends to fast melting and fuel economy. Atmospheric conditions in the combustion chamber are kept under close control to eliminate occluded gases. Sklenar type melting furnaces are readily accessible for skimming, refining, alloying and inspection during the entire melt. Basic or acid refractories can be used best suitable to the alloy to be melted. Furnace room can be kept comfortable, for the exhaust fumes and heat are easily hooded.

Hydraulic or compressed air automatic tilt is available for furnaces with capacities over 1000 lbs of brass.

(*Turn to page 76, please*)

Which one of these men do you know?

One of them will gladly consult with you on any rubber problem involving the reduction of vibration, noise, shock and wear in automobiles and trucks.

And also ready to help on that problem are others—a team of specialists in structural design, rubber compounding, the bonding of rubber to metal, and the efficient production of rubber-to-metal and all-rubber parts for the Automotive Industry.

All of these men—those pictured above, and the specialists back of them in U. S. Rubber's new, streamlined plant at Fort Wayne—are working for and with the Automotive Industry.

They're available to you—just call or write United States Rubber Company—Engineered Rubber Products Division—Fort Wayne, Indiana, or 5850 Cass Avenue, Detroit.

MADE AT FORT WAYNE BY

U.S. RUBBER
SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

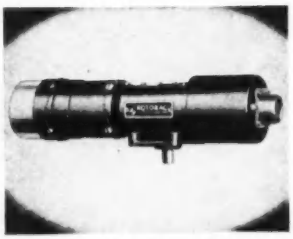
ENGINEERED RUBBER PRODUCTS FOR THE AUTOMOTIVE INDUSTRY

NEW Products for AIRCRAFT

For additional information please use coupon on page 54

S-1—Improved Rotary Actuator

Improvements on the new model Rotorac of the Airborne Accessories Corp., Hillside, N. J., include increased power rating with decreased weight, a built in radio noise filter, optional position indicating transmitter, and an adjustable "center" position switch for indicating or "seeking". The Rotorac



Airborne electrically powered right angle type rotary actuator, the Rotorac

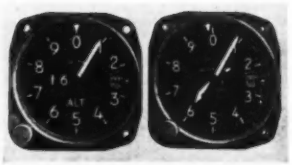
is an electrically powered right angle type actuator employed on some of the latest military aircraft and also used in industrial application. Essentially it is a reversible geared motor, magnetically braked, with a right angle power take off and a provision for controlling the number of shaft revolutions between desired limits.

The position indicating transmitter option consists of either (1) the General Electric D.C. Selsyn 3 wire type 8TJ9 for use where accuracy independent of voltage fluctuation is desired, or (2) a potentiometer for use with voltmeter indicator or for "bridge" circuit control.

The Rotorac is designed to meet specifications AN-M-10a, AAF 41251, and TN-TSESE-1.

S-2—Altimeter With Dial Counter

New Kollsman "160" altimeter of the Kollsman Instrument Division of Square D Co., Elmhurst, N. Y., shown at left, speeds up and simplifies reading of flight altitude by reason of addition of a counter on its dial, developed at suggestion of the U. S. Air Force. The new "160" altimeter, with this two-digit counter, has on its dial a single pointer only. The dial is graduated at 50 ft intervals and its single pointer makes one revolution per 1000 ft, which is then registered on the counter.



Kollsman new "160" sensitive altimeter

Kollsman conventional sensitive altimeter

The new design contrasts with the standard altimeter shown at right, having three pointers.

Development of the "160" altimeter entailed designing an extremely lightweight cylinder counter, thus reducing the torque by a factor of 20 as compared with the torque required to drive the smallest existing counter. The actuating diaphragm power was then increased 8 times. The accomplishment in terms of 20 x 8 gives the altimeter its name "160."

(Ed. Note: Correct illustration of this altimeter appears above, as contrasted with illustration published in April 15 issue, page 51).

S-3—Tube Flaring Machine

Leonard tube flaring machine, the Tubemaster

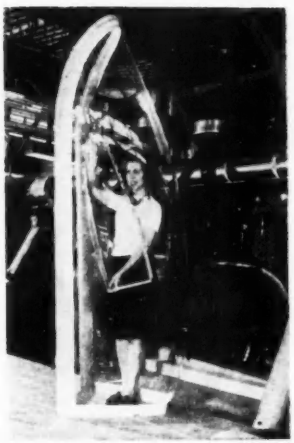
Leonard Precision Products Co., Garden Grove, Calif., has developed a new Tubemaster, for flaring, flanging, squaring and burring, either ferrous or non-ferrous tubing, ⅛ to 5 in. dia. Adapters are furnished with this new model so that present users of the smaller capacity machine may utilize their present tools and dies. Tooling is also available for beading operations.

The new model is powered with a 2 hp motor and vari-speed drive, giving a range of 70-550 rpm for handling various materials.

S-4—Plastic Canopy Shaping Machine

Massive aerial centrifugal machine, named the Rotoformer, for purpose of shaping plastic canopies of the largest sizes yet made for Air Force and Navy aircraft of all types, has been designed, installed, and placed into production by scientists of the Goodyear Aircraft Corp., Akron, Ohio.

Shaping of aircraft Rotoform canopies is accomplished by spinning at high speed, sheets of Plexiglas that have been heated to a soft, pliant state,



Large Goodyear Rotoform aircraft canopy of Plexiglas, standing on end, with small canopy hand-held, demonstrating clear optical quality. Canopy-shaping Rotoformer machine in background.

and causing them to assume their final form by centrifugal force. This only known method by which optically clear Plexiglas canopies can be made in shapes that do not conform in cross section to the arc of a perfect circle, permits their production with cross sectional contours that are geometrically close to parabolic shapes, thereby fitting into aircraft construction with maximum streamlining.

The new machine has a tubular steel rotating shaft, eight in. in dia and approximately 20 ft long, from which is suspended a fixture in which the canopy is formed. The forming fixture consists essentially of a retaining frame which has been made to exact specifications of the aperture of the airplane fuselage to which the canopy is to be fitted.

Among military aircraft for which Rotoform canopies are made by Goodyear Aircraft are the F-84 Thunderjet, FJ-1 Fury, F6U1 Pirate, and the F4U-5 Corsair.

Use

FORM-A-GASKET

For

LEAK-PROOF ASSEMBLIES

PERMATEX COMPANY INC., BROOKLYN 29, N. Y.

PERSONALS

Recent Personnel Changes and Appointments at the Plants of the Automotive and Aviation Manufacturers and Their Suppliers.

Standard Tube Co.—**A. R. Schumann,** formerly district sales manager, has been appointed Manager of Sales and **L. B. Boensch** has been made Sales Engineer, specializing in stainless and alloy steel tubular products.

Oldsmobile Div., General Motors Corp.—**G. R. Jones** is the new General Sales Manager of the division. He succeeds **D. E. Ralston,** who has been named Executive Asst. to the General Manager. **A. H. Brandel** has been named Production Manager, succeeding **P. J. Monoghan,** who takes over a new assignment in the sales department. **J. J. Edwards,** General Methods Engineer, has been advanced to General Supervisor of Standards and Methods.

Willys-Overland Motors — Announcement has been made of the election of **Gordon A. Roth** as Asst. Treasurer. **Robert A. Palmer** has been made Truck and Equipment Sales Manager. **C. Coyle Smith** has been appointed Manager of the Project Planning and Research Dept., and **Mark A. Howard** is now Business Management Manager of the Sales Dept.

Ford International, Inc. — The appointments of **Thomas G. Eybye** as regional director for Latin America and the Orient, and of **Walter L. McKee** as regional director for Europe and the Middle and Near East have been announced.

Ford Motor Co., Lincoln-Mercury Div. — **Ray P. Powers** has been appointed Manager of Quality Control for the Division.

Pontiac Division — The appointment of **P. B. Lowery** as Chief Metallurgist, succeeding the late **Z. T. Crittenden,** and the advancement of **A. H. Robinson** to the position of Asst. Chief Metallurgist, have been announced.

Kaiser-Frazer Corp. — **Charles M. Hollis** has been made Controller of the company.

Dodge Div., Chrysler Corp. — Announcement has been made of the appointment of **W. L. Kessinger** as Advertising Manager.

The White Motor Co.—**Paul L. Gillan** has been named Chief Engineer of the company.

Curtiss-Wright Corp.—**Major General Edward M. Powers,** U. S. Air Force (Retired), has been appointed Vice-President and Director of Engineering.

Westinghouse Electric Corp. — The following new appointments have been made in the Industrial Products Department: **Tomlinson Fort,** Manager, Apparatus Sales Dept.; **William W. Sproul,** Sales Manager, Industrial Products; **Royal C. Bergvall,** Engineering Manager, Industrial Products.

Necrology

Arthur R. Sleath, 62, senior member of the Ex-Cell-O Corp.'s field engineering staff, died last month in Philadelphia.

Harvey E. Schluchter, 63, retired secretary of the Ford Motor Co., died recently in Detroit, Mich.

Edward B. Corcoran, 78, pioneer in the automobile lamp industry, one of the heads of the Morrison & Corcoran Lamp Co., and who later helped form the Victor Lamp Co. died recently in Cincinnati.

Republic Aviation Corp.—**Robert S. Johnson** has been appointed Sales Liaison Engineer.

Sealed Power Corp. — The appointment of **R. E. Murbarger** to the newly created position of Director of Distribution has been announced.

American Brake Shoe Co.—**Roger W. Batchelder** has been appointed Vice-President in charge of Sales of the National Bearing Division.

Eaton Manufacturing Co.—**Sterling G. Maisch** has been made Production Manager of the Axle Division.

Bliss & Laughlin, Inc.—**Carl L. Huff** has been elected President and Director. He succeeds the late **Walter B. Howell.**

The Fellows Gear Shaper Co. — The following changes have been made in the company's personnel: **Cecil M. Peter,** formerly General Sales Manager, becomes Vice-President and General Manager, with headquarters in Springfield, Vt.; **Leroy C. King** is now Sales Manager, with headquarters in New York; **Herbert W. Nickerson** succeeds Mr. King as Eastern District Manager.

Frederic Flader, Inc.—**Dr. Victor B. Corey** has been made Manager of the Engineering Physics Div., succeeding **Carl L. Frederick.**

Climax Molybdenum Co.—**Arthur H. Bunker** has been elected President of the company.

Great Lakes Steel Corp.—Appointment of **Hubert C. Smith,** Chief Metallurgist, as Asst. Vice-President in charge of Metallurgical Control, has been announced.

Elastic Stop-Nut Corp. — **Howard Peters** has been appointed Project Engineer of the company's Rollpin Div.

Philco Corp. — **Martin F. Shea** has been appointed General Manager of the Car Manufacturing Div., and will be in charge of original equipment auto radio sales to the automobile industry.

Borg-Warner Corp.—The following additions to the executive personnel of the Pesco Products Div. have been announced: **John A. Lauck,** Vice-President; **D. A. Sutherland,** Industrial Relations Manager; **G. V. Patrick** will succeed Mr. Sutherland as Eastern Sales Manager and **Frank R. Canney** has been made Sales Engineer in charge of Pesco sales activities with airline companies.

Nash-Kelvinator Corp.—**Kenneth F. Brooks** has been appointed Plant Engineer, at the El Segundo plant.

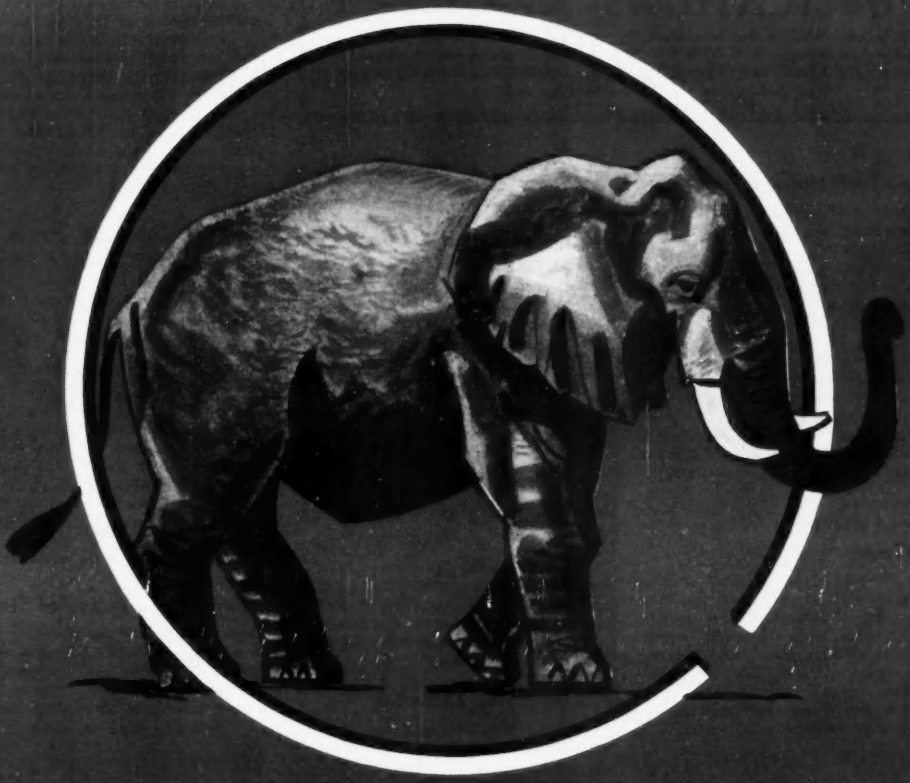
Worthington Pump and Machinery Corp. — **Hobart C. Ramsey** has been elected President of the company, succeeding **Clarence E. Searle,** who has been named Vice-Chairman of the Board of Directors. **Edwin J. Schwanhausser** succeeds Mr. Ramsey as Executive Vice-President.

BOOKS ···

PRINCIPLES OF MAGNAFLUX, by *F. B. Doane* and *C. E. Betz,* 3rd Edition, pub. *Photopress, Inc.,* 288 pp.

The third edition of this standard treatise on non-destructive magnetic testing methods completely obsoletes the earlier editions, highlighting the new methods and materials that have emerged in recent years. Intended for use by management, inspection heads, and operators, the text covers the subject starting with basic principles and running the gamut of the latest types of mass production equipment. The well rounded discussion found in this book includes chapters on non-relevant indications, interpretations of indications, and evaluation of defects, recognizing that it is even more important to know what to do about indicated defects than it is to find them.

UNIFIED AND AMERICAN EXTERNAL SCREW THREADS, published by *Reed Rolled Thread Die Co., 247 Chandler St., Worcester 2, Mass.* This 36-page booklet contains graphical illustrations of thread components, definitions, and tables of the new standard thread classes 1A, 2A, 3A, 2 and 3. The tables include limits, tolerances, and allowances of the standard and selected special threads. Available from the publisher, price 75¢ per copy.



We never forget, either

Your close co-operation with us since 1911 has been a vital factor in Sealed Power leadership. We have tried to make it a two-way co-operation all the way through—especially under wartime conditions when parts were scarce, and it was our privilege to help your owners keep their cars rolling. With your help, Sealed Power facilities are now better than ever. You are invited to make full use of them, so help make your good engines even better.

SEALED POWER CORPORATION
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Sealed Power

PISTON RINGS · PISTONS
CYLINDER SLEEVES

PUBLICATIONS AVAILABLE

Publications listed in this department are obtainable by subscribers through the Editorial Department of AUTOMOTIVE INDUSTRIES. In making requests please be sure to give the NUMBER of the item concerning the publication desired, your name and address, company connection and title.

D-16—Synthetic Lubricants

Carbide and Carbon Chemicals Corp.—A new company booklet describes the various types of "Ucon" polyalkylene glycol lubricants and the use of these products for the lubrication of many types of machinery, gears, internal combustion, engines, rubber products, and instruments. It contains much information on the various uses of Ucon fluids as hydraulic fluids; leather conditioning agents, plasticizer, softeners and solvents; defoamers, etc. Complete physical properties for both the water-soluble and water-insoluble grades of these synthetic lubricants are presented.

D-17—Automotive Wire and Cable

The Electric Auto-Lite Co.—A new 32-page 4-color catalog describes the Silver Line of automotive wire and cable. It contains specifications on this new line as well as other lines produced by the company. The Silver Line incorporates several improvements, including a new power line battery terminal, new pressure terminals and Flex-strand, a new wire calculated to withstand vibration and easier to handle.

D-18—Die Cushions

E. W. Bliss Co.—A new reference manual on the general uses, advantages and maintenance of press die cushions and allied equipment is available. Detailed descriptions, dimension tables and maintenance procedure are included for all sizes of Bliss-Marquette Pneumatic and Hydro-pneumatic Die cushions, as well as allied equipment, including locking devices, die cushion controls, overload relief beds, regulator valves, etc.

D-19—Loading and Hauling Units

The Euclid Road Machinery Co.—A new 24-page book entitled "Euclid Loader for High Speed Loading of Large Hauling Units" contains a number of operating views showing the loader at work on various jobs.

D-20—Friction Materials

Raybestos-Manhattan, Inc., Equipment Sales Div.—Just issued is a new 8-page 2-color bulletin featuring friction material in special shapes. The bulletin explains the company's research and development facilities and gives a short list of friction material developments made by their engineers. The bulletin also includes a list of data required to figure on special needs, engineering data on torque and horsepower calculations, brake calculations for heavy blocks and a friction material data sheet.

D-21—Precisionaire Gages

The Sheffield Corp.—An attractive, new, column type Precisionaire catalog is available. It illustrates and describes various standard models of this instrument as well as numerous special applications.

D-22—Gearshift Drives

The Lima Electric Motor Co.—Bulletin DB-1 describes in detail the company's gearshift drives for selective speed machine operation; Lima Electric Motors and Lima Pedestal Grinders; Buffing and Polishing Lathes. The bulletin is illustrated and contains complete type and gear ratio information.

D-23—Heat Treating of Steels

Cooley Electric Manufacturing Corp.—A new booklet entitled Shop Notes on Heat Treating of Steels, discusses, in a non-technical manner, typical heat treating procedures (including heating,

(*Turn to page 56, please*)

***TIME SAVER COUPON** for your convenience in obtaining, WITHOUT OBLIGATION, more information on any one or more of the publications described above OR New Production and Plant Equipment OR New Products items described on other pages.*

Readers' Service Department,
Automotive Industries,
Chestnut & 56th Sts., Philadelphia 39, Pa.

Please send me: **These FREE Publications** (Use letter and designating number of each item desired)	*Please send me more information on:* **New Production and Plant Equipment** (Use letter and designating number of each item desired)	*Please send me more information on:* **New Products** (Use letter and designating number of each item desired)
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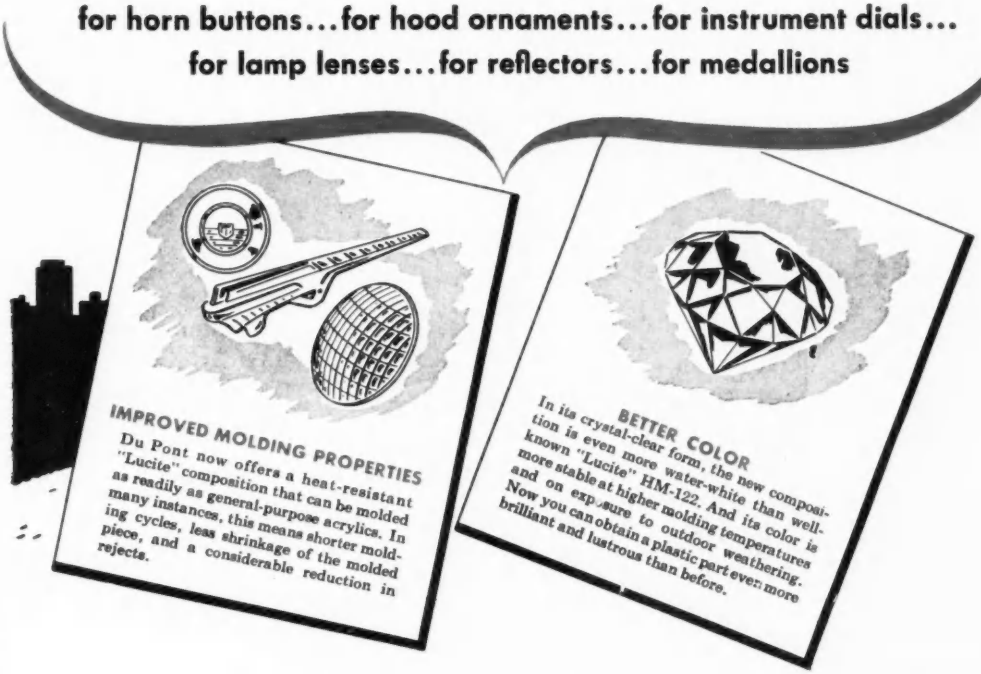
Your Name ..... Your Title .....

Your Company Connection or Business .....

Address .....
(Street & No.) (City) (Zone) (State)

New "Lucite" HM-140 offers these improved features

for horn buttons...for hood ornaments...for instrument dials... for lamp lenses...for reflectors...for medallions



IMPROVED MOLDING PROPERTIES

Du Pont now offers a heat-resistant "Lucite" composition that can be molded as readily as general-purpose acrylics. In many instances, this means shorter molding cycles, less shrinkage of the molded piece, and a considerable reduction in rejects.

BETTER COLOR

In its crystal-clear form, the new composition is even more water-white than well-known "Lucite" HM-122. And its color is more stable at higher molding temperatures and on exposure to outdoor weathering. Now you can obtain a plastic part even more brilliant and lustrous than before.

OF SPECIAL INTEREST TO MOLDERS AND DESIGNERS OF MOLDED PARTS—

New "Lucite" HM-140 is much more heat-stable than "Lucite" HM-122, which has been widely used in the automotive industry. For thin or intricate sections, *higher* molding temperatures can be used to attain the greatest degree of fluidity possible—without chemical breakdown. Because of its better flow properties, it can be molded into thick sections at *lower* temperatures. These features provide a wider molding range and improved molded parts.

New "Lucite" HM-140 fits right into your "Micro-Styling"* plans

"Lucite" HM-140 with its luxurious beauty... its wide range of long-lasting colors... its rugged durability... is ideal for those little things that impress the style-conscious customer. "Lucite" has given outstanding performance in a wide range of automotive applications since 1937. The improved features of this new Du Pont plastic mean that hood ornaments, horn buttons, lenses, dial faces—all of the accessories included in Micro-Styling—can now be even more practical and attractive when made of "Lucite."

* **Micro-Styling:** *the design of small but important automobile accessories for beauty and utility too.*

Write for further information on "Lucite" HM-140 and other Du Pont plastics. No obligation. If you wish, Du Pont technical men will be glad to consult with you in confidence and advise on applications of Du Pont plastics to help your design and engineering plans. Write to the Plastics Department, E. I. du Pont de Nemours & Co. (Inc.), at the most convenient address: General Motors Bldg., Detroit 2, Mich.; Empire State Bldg., New York 1, N. Y.; 7 S. Dearborn St., Chicago 3, Ill.

DU PONT
REG. U. S. PAT. OFF.
Plastics
BETTER THINGS FOR BETTER LIVING
... THROUGH CHEMISTRY

quenching, tempering and atmosphere control) and tips for better heat treating. Definitions of heat treating terms are also given.

D-24—Cooper Alloy Comparison Chart

The Cooper Alloy Foundry Co.—A detailed engineering comparison chart, one of a series, designed to assist in the selection of stainless steel valves, is available.

D-25—Materials of Construction

Fischer and Porter Co.—Materials of construction and packing materials for use with some 300 industrial liquids and gases are listed in a new and revised Catalog Section 97. This tabulation of corrosion-resistant materials is based on previously published data, complemented by the company's experience in handling corrosive fluids.

D-26—Tru-Fit Tools

Lectrolite Corporation—A new catalog describes the Tru-Fit line of combination pliers, wrenches, tire tools and special automotive tools. It contains information on all the latest additions to the company's line.

D-27—Cutters—Reamers

Special Cutter and Tool Co.—A four-page bulletin describes the company's specialized service in making cutters, reamers and related products. It includes illustrations of numerous tools produced, together with a product listing.

Dynaflow Production

(*Continued from page 29*)

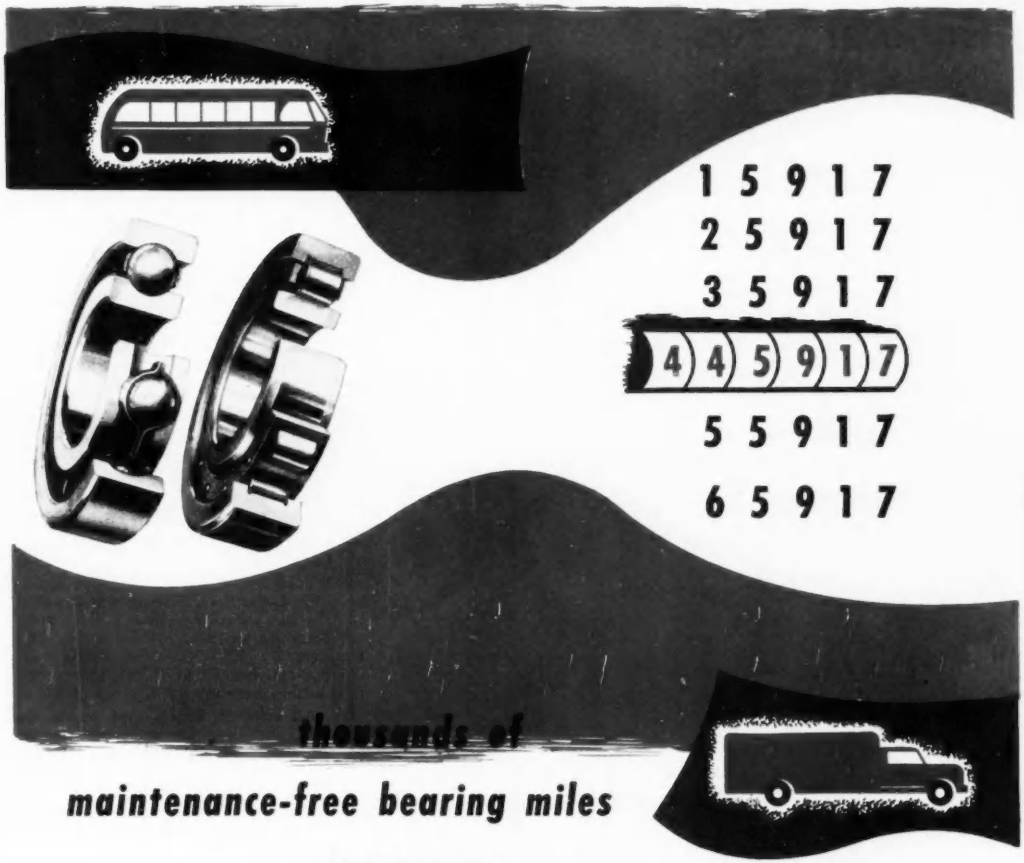
six pieces per revolution of the table. This allows two stations at the front for loading and unloading, and five working stations for each side.

With allowance for rated efficiency, turbine hubs are finished in this machine at the rate of 95 an hour. It has a total of 23 tools of various kinds, most of the turning tools being of cemented - carbide, using solid bits, round or square or triangular in form. Core drills and boring blades are of high speed steel, while tools for turning the recess are of cobalt type. Fastest rate of metal removal is on the periphery of the flange — the largest diameter of the piece — and this is at the rate of 264 sfpm.

Noteworthy too is the machining of the front pump cover, illustrated here. It is representative of several parts in which material specifications have been changed from steel to cast iron. Here the spotlight is on a series of three Besly grinding operations on both faces, since Buick demands fine surface finish, accurate thickness, and close control of parallelism of the two faces. These machines are of two-wheel type with a rotating table between the wheels for carrying the parts, finishing both faces simultaneously. The roughing operation removes from 0.020 to 0.030 in. of metal on a side. This is followed by semi-finish grinding. At this point the work goes through the various drilling and boring operations, then finish-grinding in the Besly. Although thickness is specified at 0.310-0.317 in., it is invariably held much closer. Parallelism of the outer gasket outline is held to less than 0.001 in. The final operation is precision boring of the center hole and dowel pin holes.

Peru Buys Most Engines Under 10-Hp

A recent report by the Dept. of Commerce indicates that internal combustion engines are not made in Peru, and that the largest unit sales of internal combustion engines are of carburetor type not over 10-hp. These engines find wide use for general farm purposes. Carburetor-type marine engines are used principally in the small boats of the fishing fleets in which 5-15-hp engines are commonly installed.



thousands of maintenance-free bearing miles on SKF ball and roller bearings

Truck and bus manufacturers rely on the performance of SKF Bearings. They know that these rugged units stand up under the severest operation without maintenance attention.

The reason: SKF Bearings keep important moving parts in correct alignment, have high capacity for heavy radial and thrust loads . . . which add up to economical, long bearing life.

SKF Single Row Deep Groove Ball Bearings
SKF Cylindrical Roller Bearings
SKF Propeller Shaft Boxes form a complete line of quality-manufactured, expertly designed units that make the tough jobs easy. Our engineering staff can help you with your bearing applications. SKF Industries, Inc., Philadelphia 32, Pa. 6566

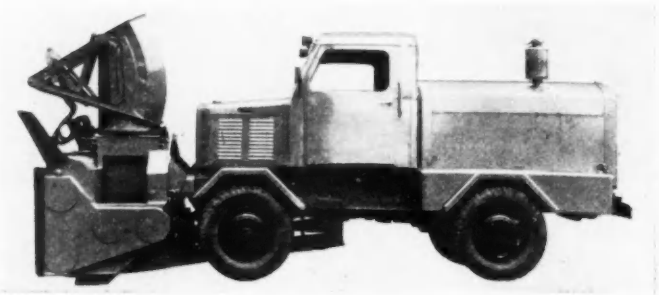
Automotive Bearings engineered by **SKF**

General News

(*Continued from page* 23)

Engineers to Survey for Synthetic Fuel Sites

The Corps of Engineers, at the request of the Department of Interior, has awarded a $1.3 million contract for a survey in 37 states and Alaska, to determine suitable general areas for the manufacture of synthetic liquid fuels.



Lightweight Equipment for Snow Clearance

Sicard, Ltd., Montreal, has introduced the Junior Snow-Master. By the use of aluminum in 17 parts, the new snow clearance unit weighs 5500 lb, and its companion Model 400 four-wheel tractor weighs 7500 lb. The functions of the combined units are three phase: for snow-fighting; for street-cleaning with rotary-broom and 2¼ cu yd dump-body; and for all other applications requiring a truck to carry a load and to offer a maximum traction when needed. The dimensions, in inches, of the Junior Snow-Master are: overall length 239; overall width 72; overall height with loading-chute closed 107; and with loading-chute open 131.

All controls are located inside the cab. A hydraulic pump is operated from the crankshaft, through two needle-bearing universal joints. The loading-chute, turbine and blower-lifting device are operated by hydraulic cylinders. The tractor transmission is a sliding-gear type combined with a two-speed transfer-case, giving eight speeds forward and two reverse. Chassis dimensions, in inches, of the tractor are: wheelbase 100; overall length 163.

The Junior Master is powered by a Hercules Model RXLD gasoline engine, L-head, six-cyl type. Its specifications are as follows: bore and stroke 4¾ in. by 5¼ in.; displacement 558 cu in.; and bhp at 2000 rpm 145. Powering the tractor is a Chrysler Model T-120 gasoline engine also of L-head six-cyl type. It has a bore and stroke of 3 7/16 by 4½ in., displacement of 250.6 cu in. and develops 76 hp at 2000 rpm. Major aluminum components in the Junior Master construction scheme besides the engine pistons are the hydraulic cylinder-base and cylinder-block; the chute-retainer ring and chute gear-ring; the front gear-box casting and box side bearing casting.

Automotive Tax Repeal Not Considered Likely

The automobile industry is watching with considerable interest, but not too much optimism, the progress of a bill

(*Turn to page* 60, *please*)

Better Your Products with Michigan WELDED STEEL TUBING

The Modern Electric Resistance Welded Steel Tubing

ROUND

¼" to 4" O. D. 9 to 22 gauge

SQUARE-RECTANGULAR

½" to 2" 20 gauge 1" to 2¾", 14, 16, 18 gauge

Can be Bent, **FLANGED, EXPANDED, TAPERED, DEPRESS BEADED, ROLLED, EXTERNAL UPSET, INTERNAL UPSET, SPUN CLOSED, FORGED, BEVEL FLANGED, FLATTENED, SWAGED, FLUTED, EXPAND BEADED**

A Quality Product

Thousands of manufacturers use Michigan Electric Resistance Welded Steel Tubing to produce better products at lower cost. Available in a wide variety of shapes and sizes for almost any application. For reasons of design simplifications, fabricability, uniformity, ductility, ease of assembly and installation, Michigan tubing cannot be surpassed for working in your plant or prefabricated by Michigan.

RESISTANCE-WELDED STEEL TUBING

Michigan STEEL TUBE PRODUCTS CO.

THE OLDEST NAME IN ELECTRIC

33 Years in the Business

9450 BUFFALO STREET • DETROIT 12, MICHIGAN

FACTORIES: DETROIT, MICHIGAN • SHELBY, OHIO

For Engineering advice and technical help in the selection of tubing best suited to your needs consult us.

DISTRIBUTORS: Steel Sales Corp., Detroit, Chicago, St. Louis, Milwaukee, Indianapolis and Minneapolis—Miller Steel Co., Inc., Hillside, N. J.—C. L. Hyland, Dayton, Ohio—Dirks & Company, Portland, Oregon—James J. Shannon, Milton, Mass.—Service Steel Co., Los Angeles, Calif.—American Tubular & Steel Products Co., Pittsburgh, Pa.—Strong, Carlisle & Hammond Co., Cleveland, Ohio—Drummond, McCall & Co., Ltd., Toronto, Canada.

General News

(*Continued from page 58*)

introduced in Congress to repeal Federal emergency automobile taxes. The bill would repeal all Federal levies on cars, trucks, buses, gasoline, lubricating oil, tires and tubes, and parts and accessories. Representative Thomas E. Martin of Iowa, who introduced the bill, says that such taxes cost more than a billion dollars a year, but have no connection whatever with Federal aid for highways.

Install More Powerful Jets on Boeing XB-47

The installation of GE J-47 turbojets in one of the two experimental XB-47's will service test the new, higher power engines for use in the production of B-47's now being built for the USAF at the Boeing Wichita (Kansas) Div. The new engines will give the Stratojet a total power potential of more than 48,000 lb of thrust, when using its six J-47 turbojets and its assisted take-off rockets. The top speed of the Stratojet is placed by the Air Force "in the 600 mph class." Use of the new GE J-47's will raise total power of the Stratojet more than 25 per cent. Each of the new engines develops more than 5000 lb of thrust, compared with 4000 lb of thrust per engine of the earlier J-35 turbojets currently installed in the swept-wing bomber.

K-F Stockholders Reject Compulsory Dividends

The stockholders of the Kaiser-Frazer Corp. have voted down a proposal that the company pay a regular quarterly dividend, when, as, and if earned after last Dec 31. The company reported a loss for the first quarter of this year of $5.8 million, compared with a $2.9 million profit in the same quarter of 1948. Refunds to dealers when the company cut prices cost the company approximately $4.1 million and was a large factor in the loss.

Name Prance Controller of Ford International

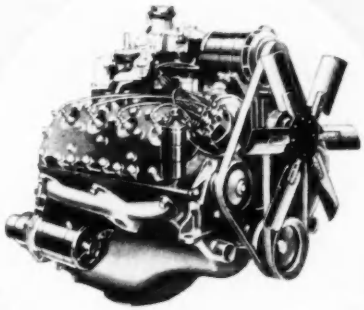
Percival F. A. Prance has been appointed controller of Ford International, Inc., according to Norbert A. Bogdan, vice president and treasurer. Mr. Prance was assistant treasurer of the Suburban Propane Gas Corp., and had previously been with the Freeport Sulphur Co. and General Motors Overseas Operations Div.

Powers Heads Quality Control at Lincoln-Mercury

Ray B. Powers has been appointed manager of quality control for the Lincoln-Mercury Div. of the Ford Motor Co.

For Power, Pick FORD...

Be Right 3 Ways!



Ford 239 V-8 Industrial Engine
(239 cu. in. displacement)

1 **RIGHT POWER** for your job or equipment. Your choice of five great new models in the Ford Industrial Engine line.

2 **RIGHT FEATURES,** because Ford Industrial Engines incorporate all the latest advancements of Ford's progressive engineering.

3 **RIGHT SERVICE**—Ford Dealers provide complete service facilities everywhere, to keep Ford power always on the job.

Schramm, Inc., of West Chester, Pa., has been purchasing Ford engines for 14 years, using them with Schramm compressor conversion heads in the Model 60 Schramm engine-driven compressor that has won world recognition. Illustrated is the new self-propelled crawler in use as a weed burner. The Ford 239 Industrial Engine is standard equipment, with four cylinders altered to act as air compressors. The remaining four cylinders furnish the motive and compressing power.

Ford
INDUSTRIAL ENGINES

Now's the time to get acquainted with the five great new engines in the Ford Industrial Engine "power family." There's a "four" of 120 cu. in. displacement . . . two "sixes"—226 cu. in. and 254 cu. in. displacement . . . two "V-eights"—239 cu. in. and 337 cu. in. Each one completely new, the *right* power for you. Widely used for farm implement power, construction, standby units, material handling, pumping, many other applications. For complete specifications, write direct to . . .

INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT
FORD DIVISION OF FORD MOTOR COMPANY
Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

High Compression Without High Octane

(*Continued from page 39*)

mixture (90 per cent alcohol, 10 per cent water). When introducing a mixture of 70 per cent gasoline, 15 per cent alcohol and 15 per cent water some strange things can happen, not all of them bad. Normally manifolds are designed for gasoline to keep the inside cylinder of an end pair from getting too much fuel and in spite of these long forgotten corrections the inside cylinders still run rich. With alcohol the outside cylinders run very rich and the inside run very lean. It is fair to say that the alcohol-water section of a mixture will tend to charge the lean cylinders more than the rich cylinders. This would be fortuitous, however it should be looked into, particularly since a present-day corrected gasoline manifold is notoriously bad at the turns for volumetric efficiency. It may well be that a more rounded and smoother turn in the manifold would improve the engine all around when the alcohol water injection is being used.

The degree of heat applied to the mixture during full throttle is still a problem. A little heat at the mixture goes a long way toward "making" detonation. At part throttle there is no heat limit, the more heat the leaner the mixture that will burn without missing. This is probably where alcohol-water injection does a good job for full throttle since the same amount of heat applied to the mixture is much less effective in raising initial mixture temperature than with gasoline.

Hot spots in the combustion chamber are problems. These areas must strike a safe heat level or else they provide the nuclei of preignition. The incoming charge and turbulence prior to ignition must provide the cooling of the exhaust valve head, piston head or any area that might run hot due to bad external cooling. The pick up of heat by the mixture, while this mixture is "healing" the hot spots, is multiplied exponentially at the end of the burn in proportion to compression ratio.

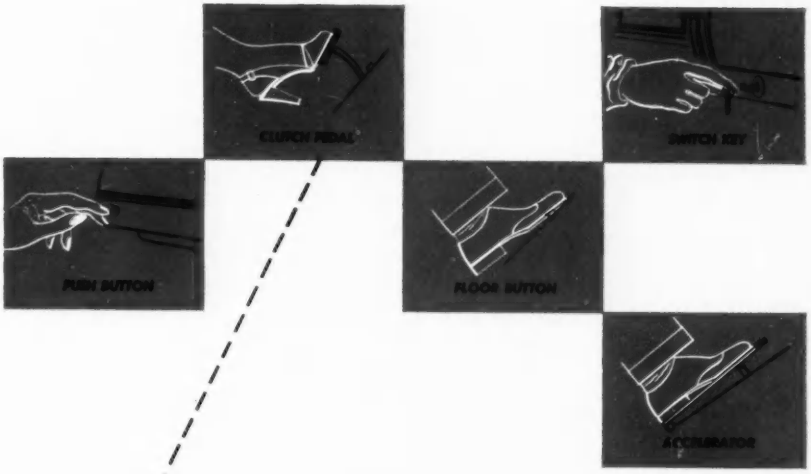
Mixture distribution and internal hot spots are probably the worst offenders against detonation control insofar as the engine is concerned, assuming reasonable anti - detonation combustion chamber design has been incorporated. The wetter the mixture the more difficult by far is the problem of distribution among cylinders. The greater the hot spots in the combustion chamber the wetter the raixture must be to cool by vaporization. Through poor distribution a greater porportion of the fuel goes into the cylinders already suppressed for detonation by rich mixtures, hence it takes more fuel than makes sense to drown out detonation in the leaner or detonating cylinders.

It is clear that casual anti-detonation control has a limited area of application, usually three-quarters to full throttle. Therefore we cannot look kindly on suggestions that advise the use of smaller engines in order to keep our operating range nearer to full throttle. This is a basis that considers only that specific fuel consumption is mathematically or thermally poorer at part throttle than at full throttle, which it is not. Pounds of fuel per hour is more meaningfull for road loads than pounds of fuel per bhph. Most carburetors provide with the power jet near to 30 per cent richer mixture at throttle openings above three-quarters, and this 30 per cent increase smothers the comparative efficiencies of part or full throttle.

We have not yet begun to exploit the leanest mixture that will burn without missing at below three-quarter throttle. Simple spark plug improvements can make fabulous differences. However, these avail us little at full throttle if we must turn on the "fire hose" to extinguish the glowing exhaust valve. If it were not for the fact that fuel must be used at full throttle to cool the engine we should be on the threshold of a

(*Turn to page 64, please*)

SPECIALISTS IN ALL TYPES OF STARTING



CLUTCH PEDAL STARTING FOR ADDED SAFETY

Bendix

STARTER DRIVE

for Added Reliability . . .

The extra safety of clutch pedal starting combined with the time-tested reliability of the Bendix* Starter Drive makes a sales combination that is hard to beat. Best of all, you can add clutch pedal starting at a lower cost with the Bendix Starter Drive than any other way. With a record of over 80,000,000 installations, it's the best proved drive in the industry. In addition, its compactness lets you mount starting motors almost anywhere, giving greater flexibility of design. No matter which kind of engine starting you employ, specify Starter Drives by Bendix—specialists in *all* types of starting.

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ECLIPSE MACHINE DIVISION of
ELMIRA, NEW YORK
Detroit Office: 8-212 General Motors Bldg.

Bendix
AVIATION CORPORATION

fuel economy that would make everybody happy. If we raise our compression ratio without considering the temperature of the last gas to burn and depend upon chemistry to permit operation, then a considerable part of that chemistry will be used up in quenching the effect of the hot spots in the combustion chamber which affect the sharply rising final temperature of the burn.

It would make more sense to increase the engine size and provide an intake valve equal to three-quarter throttle opening and throw away the power jet. This would mean an engine without full throttle provisions and thus we could exploit the leanest mixture that would burn. However, as said above, no one would consider this, and in fact we can do better. Let us eliminate the hottest spots in the combustion chamber by design. Let us make it unnecessary to cool the engine internally and thus make open to us the opportunity of exploiting the fuel economy without compromise for full throttle.

We would recommend the following program:

Eliminate the exhaust valve or reduce its temperature to 600F. Oil cool center of piston head. Raise compression ratio to borderline detonation with 70 octane fuel. This could be around 9 to 1, certainly not less than 8.5 to 1. With development work this could give 11 to 1 with 80 octane fuel for premium fuel cars.

Exploit the leanest mixture that will burn below three-quarters throttle by hottest possible spark plug, spark plug position, chamber shape, hottest possible mixture temperature, minimum valve overlap and no tappet adjustment variation.

Exploit the blending of fuel to give ideal surface tension for the best mixture distribution of wet mixtures.

Exploit the elements in fuel that would affect the burnability of lean mixtures.

Reduce the volume of mixture burned per mile by a transmission set to give minimum revolutions per mile for the various types of loads without excessive slip between engine and wheels.

This program would have as its target: Maximum fuel economy; Maximum compression ratio for present fuels; Reduction of the range of octane requirements of piston engines.

We should add that a most desirable condition would be to have vehicle engines and jet engines using as near as possible the same fuel.

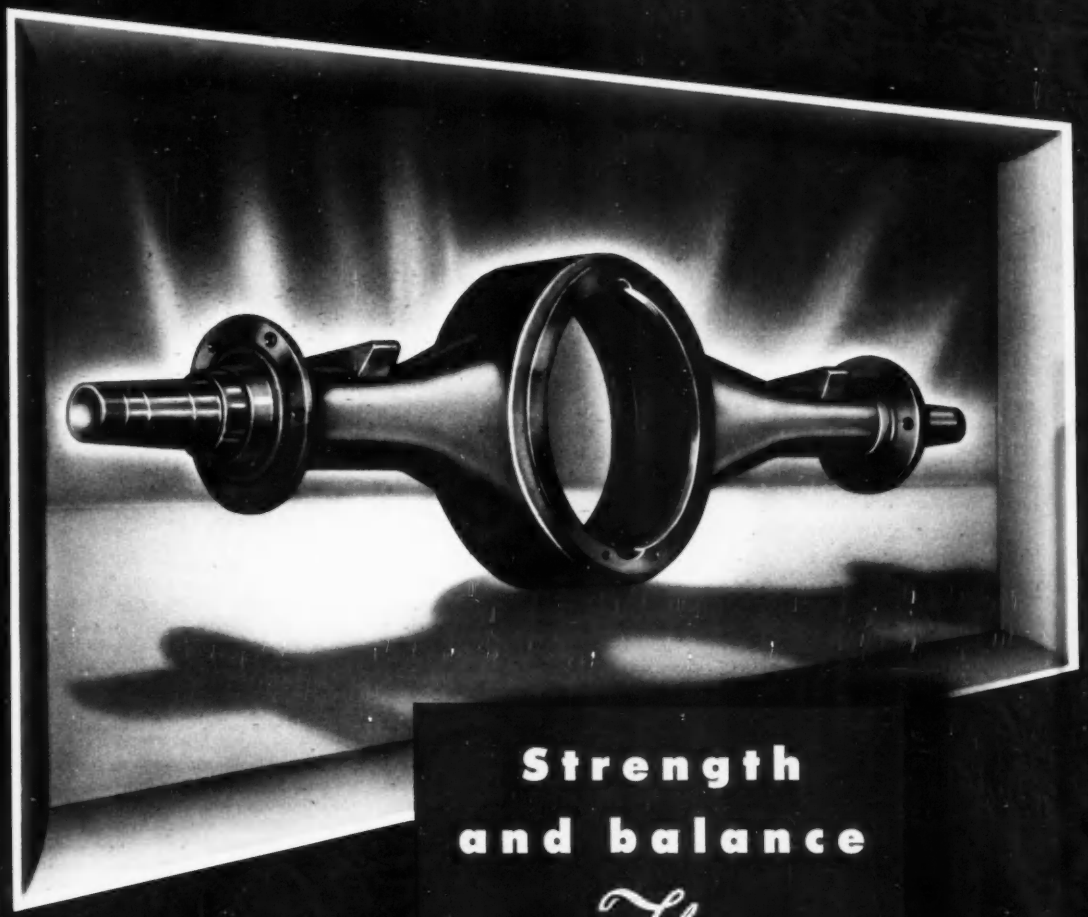
A near-common fuel for all purposes would not only be economically ideal, but could have important value to our systems of defense. The armies of the world are insisting on aircooled engines for military vehicles, and the published stories here on military engines indicate that this is true also in the U. S. Army. Aircooled engines when used in a vehicle must be de-rated as compared to those used in aircraft.

How much simpler the total problem of aircooled vehicle engines for the services would be if they could be inherently internally cooled, thus to be operated at full power with 65 to 70 octane fuel; designed to make external cooling a simple matter by minimizing the waste heat flow back into the cylinder head and cylinder barrel; and could eliminate the exhaust valve as now used. (See illustrations of engines without exhaust valve—Sabre, Centaurus and Eagle.)

It is possible to approach a condition where an upgraded jet engine fuel could be used in military vehicle engines at 6 to 6½ to 1 compression ratio. The advantages of such a prospect are easy to visualize, however the implementation requires rigid engineering discipline. Yet the importance of engine development to bring all the services near to using one fuel cannot be left unmentioned. Certainly our first step should be to limit the octane numbers of fuel from 55 to 84. This range should cover everything that requires other than heavy oil fuels.

Perhaps we hope too much, yet there it is, a distinct possibility and the least we should draw from this is that we should not waste our time or investments on a high volume of fuel above 84 octane.

Part Three of this article will appear in an early issue of AUTOMOTIVE INDUSTRIES.



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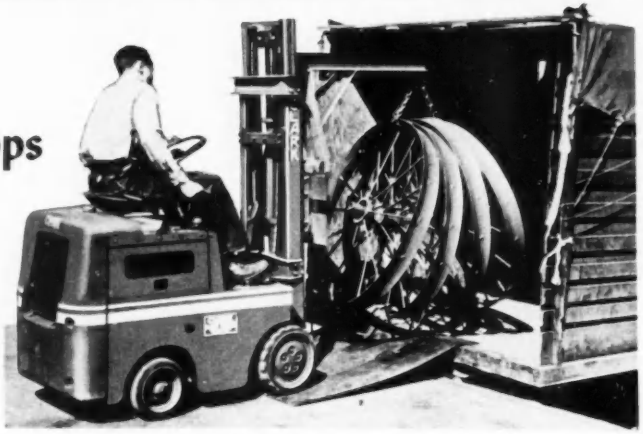
SEE OTHER SIDE.....

MATERIAL HANDLING *News*

How OLIVER Raises Bumper Crops of Savings



With crane attachment and chain, the Clark loads farm implement wheels, once dangerous to handle, into a delivery truck

Have you a perplexing problem of materials handling in your business? —a wide variety of sizes, awkward shapes and weights, and perhaps highly finished surfaces requiring careful handling? The high cost of moving, storing and loading such items is a daily, urgent

Tractor engines are skid-mounted for easy handling. Orderly storage saves time

pressure for fast, safe, economical handling methods.

Take a tip from the experience of the Oliver Corporation, in its plant at Fairfax, near Kansas City.

To keep pace with the demands of modern farming, Oliver worked out a plan for handling and storing farm implements and varied stock of service parts, and installed a Clark fork-lift truck to do all the "dirty work."

Box cars containing mixed loads of complete machines and parts are unloaded, each item carried to its assigned area in the warehouse, and material delivered at the shipping dock as called for—all by the fast maneuverable fork truck. Frames, engines, wheels and other large items are picked up "as is"; small units are usually palletized. A crane attachment is used for moving wheels.

All these heavy, bulky units were formerly "problem" cases—difficult, sometimes back-breaking, often extremely hazardous. Today, handled by the husky Clark, everything moves quickly and easily—and accidents are practically nil.

Have you scrutinized your business —your production plan, your materials handling operations—to discover how you may speed turnover and increase profits? It's richly worth doing—especially with a trained Clark representative to help you. It's a sound step to CONSULT CLARK.

250-lb drill hoppers—unusually long and unwieldy—are stacked two-high, handled singly

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AND INDUSTRIAL **TOWING TRACTORS**

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AUTHORIZED CLARK INDUSTRIAL TRUCK PARTS AND SERVICE STATIONS IN STRATEGIC LOCATIONS

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GEARS AND FORGINGS · RAILWAY CAR TRUCKS · ELECTRIC STEEL CASTINGS
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Business in Brief

Written by the Guaranty Trust Co., New York, Exclusively for AUTOMOTIVE INDUSTRIES.

Generally expanded business conditions are indicated. Electric power production, railway freight loadings, crude oil output and bituminous coal production increased during the week ended June 25, while department store sales and construction activity declined. The *New York Times* index of activity for the week ended June 18 stands at 139.7, as compared with 144.9 in the preceding week and 149.2 a year ago.

Sales of department stores during the week ended June 25, as reported by the Federal Reserve Board, equaled 247 per cent of the 1935-39 average, as compared with 285 in the week before. Sales were six per cent below the corresponding distribution a year ago, as against a preceding decline of eight per cent. The total in 1949 so far reported is four per cent less than the comparable sum in 1948.

Electric power production increased more than seasonally during the week ended June 25. The output was 4.0 per cent above the corresponding amount in 1948.

Railway freight loadings during the same period totaled 802,941 cars, 23.7 per cent more than the figure for the week before but 9.6 per cent below the corresponding number recorded in 1948.

Crude oil production in the week ended June 25 averaged 4,883,400 bbl daily, 21,750 bbl more than in the preceding week but 604,500 bbl under the comparable output in 1948.

Production of bituminous coal and lignite during the same week is estimated at 11,785,000 net tons, 561 per cent more than the output in the week before when miners were on a "vacation."

Civil engineering construction volume reported for the week ended June 30, according to *Engineering News-Record*, was $180,900,000, or 16 per cent less than the preceding weekly figure but 12 per cent above the comparable sum in 1948. The total recorded for 26 weeks of this year was 18 per cent more than the corresponding amount in 1948. Private construction for the period was 17 per cent above that a year ago, and public construction increased by 18 per cent.

The wholesale price index of the Bureau of Labor Statistics during the week ended June 21, at 153.2 per cent of the 1926 average, was one per cent less than in the preceding week and 8.3 per cent below the corresponding figure in 1948. Declines were registered in all major commodity groups, with the exception of fuel and lighting materials, which showed no variation.

Member bank reserve balances decreased $301 million during the week ended June 29. Underlying changes thus reflected include a decline of $238 million in Reserve bank credit and increases of $81 million in money in circulation, $20 million in Treasury cash, and $20 million in non-member deposits and other Federal Reserve accounts, accompanied by an advance of $45 million in gold stock.

Total loans and investments of reporting member banks increased $3 million during the week ended June 22. A decline of $93 million in commercial, industrial and agricultural loans was recorded, marking the 23rd consecutive weekly reduction. The sum of these business loans, $13,292 million, shows a net decrease of $1063 million in 12 months.

The Motor Vehicle in Spain

(*Continued from page 25*)

Immediately after the Spanish civil war had ended the General Motors Overseas Corp. surveyed the automotive situation in Spain with a view to establishing a factory here for the production of Chevrolet trucks.

An elaborate prospectus, complete with illustrations, was submitted to the Spanish government. This comprehensive prospectus made an exhaustive analysis of the problem of transport in Spain and listed GM's proposals for a solution. General Motors engineers said that the answer to Spain's problems was the establishment of an autonomous automotive industry which would supply cars for: (1) the extraordinary necessities of a program of reconstruction and recuperation from the civil war, and (2) the ordinary necessities of army, commerce and Spanish industry.

The GM engineers set forth their belief that 59.07 per cent of the weight of the chassis, constituting 44.76 per cent of the value, FAS (Free Alongside Ship), could be constructed of materials available in Spain.

Although the Spanish government heartily endorsed the idea of setting up an autonomous automobile industry in Spain, disputes over control of such industry have stalemated negotiations between Franco officials and General Motors up to this time.

Fiat has been more receptive to Spanish government requirements and is scheduled to start operation in Barcelona as soon as a plant can be erected and the machinery installed.

Perusal of government records shows that the motor transport system in Spain has been steadily deteriorating since 1934. In that year there were 190,558 motor vehicles for a population of 22,000,000, or roughly one unit for each 113 inhabitants. Despite heavy war losses, the population of Spain has increased meanwhile to 28,000,000. Yet the most recent available registration statistics—those of 1947—showed only 129,660 motor vehicles in circulation, or one for each 223 inhabitants.

A government survey completed in 1945 indicated that Spain needed a fleet of at least 225,000 cars and trucks to fill its transport needs. It was estimated that an annual supply of 41,000 new automobiles would be necessary to maintain this minimum in operation.

No passenger cars were produced in Spain during 1945 or 1946 with the possible exception of a few small custom built vehicles with imported or rebuilt engines. The only trucks produced during those years were assembled in body shops employing used or imported chassis and engines. It was estimated that only between 50 and 100 motorcycles were produced annually in Spain between 1944 and 1947.

Production increased during 1947 and 1948. There are now two automobile factories and several motorcycle plants in operation. Manufacturing methods, by comparison with those in America, are woefully antiquated with much work being done by hand.

Data assembled by American observers indicated that during last year total Spanish automobile output included 90 passenger cars, 300 station wagons, 370 trucks and buses, 75 truck-trailers and 2253 motorcycles. During the same year Spain imported 2545 passenger cars, 4355 trucks and buses and 20,158 motorcycles. It can be seen from these figures that Spain is still a long way from the minimum quota outlined by its experts in 1945.

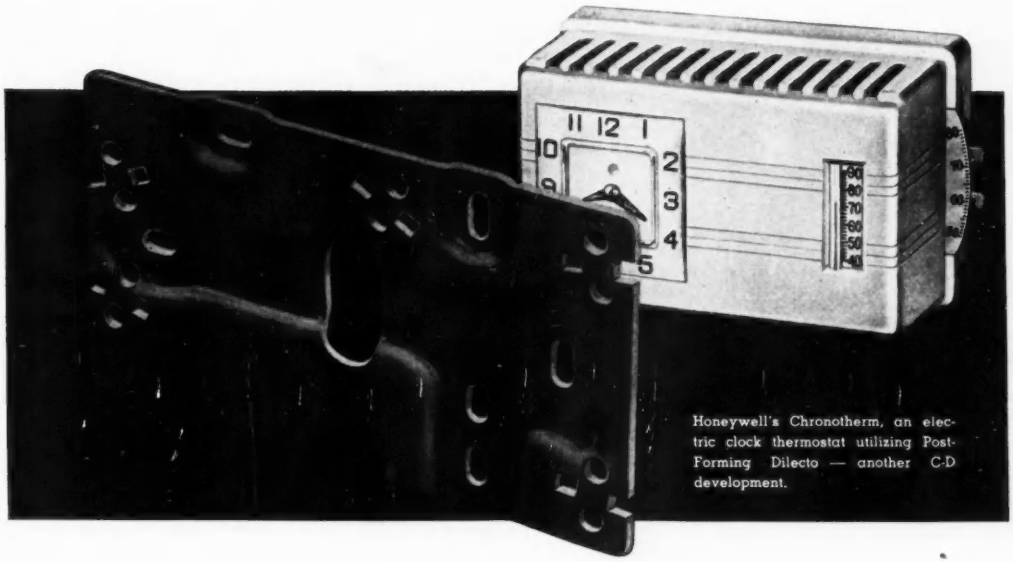
Automobile experts who have gone into the situation thoroughly are agreed that the Spanish market would not warrant production of various and sundry types of motor cars and trucks. The consensus seems to be that the most feasible plan would be to produce one type of passenger car, one type of light truck, and one type of heavy truck.

This is the program now being fol-

(*Turn to page 70, please*)

another C-D development . . .

an unusual material that can change your ideas about molding plastics!



Honeywell's Chronotherm, an electric clock thermostat utilizing Post-Forming Dilecto — another C-D development.

From Continental-Diamond laboratories comes a different plastic that makes parts production faster, easier, and more economical! Post-Forming Dilecto can be formed at a temperature of only 300° F and 200 lbs. pressure. It faithfully retains the shape you give it—eliminates the need for molding many different shapes. Expensive molding dies are no longer necessary. Available in sheet form or finished parts.

Post-Forming Dilecto is another reason why it pays to see C-D first in your search for the right plastic. For C-D Plastics provide *practical* combinations of mechanical, electrical, and chemical properties—structural strength, light weight, moisture, heat and corrosion resistance. For fast delivery or additional information, call your nearest C-D office, now.

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lowed by the Spanish government. Under the watchful eye of INI, Spain is now attempting to help relieve its transport problem by the manufacture of one heavy-duty truck, the "Pegaso," and a passenger automobile, the "Eucort," two of its three models being adaptable for light trucking.

The Pegaso, which is being manufactured in the old Hispano-Suiza plant at Barcelona, is an eight-ton truck with eight speeds. It is powered by a six-cylinder gasoline engine of 344.6 cu in. piston displacement rated at 110 hp at 2750 rpm, with a taxable horsepower of 29. Only the chassis are produced at Barcelona. These chassis, weighing 11,396 lb, are shipped either to Bilbao or Madrid assembly plants for the addition of bodies and cabs.

Most of the bodies for the Pegaso trucks are built at Bilbao by the Seida corporation, which is a concern associated with Chrysler. There are, however, some small shops at Madrid and elsewhere where custom-built bodies are produced on a small scale.

The Pegaso is regarded as a fairly serviceable truck and the price is favorable with that of imported American heavy-duty vehicles when one takes into account the per cent impost levied on American automotive imports.

The company manufacturing the Pegaso is called the Empresa Nacional de Autocamiones. It is owned 100 per cent by INI, making it a purely government outfit. The Empresa Nacional de Autocamiones claims to be turning out thirty Pegaso chassis per month, but outsiders regard this claim as a bit extravagant.

Engineers at the Pegaso factory have been working on a Diesel engine which would replace the gasoline engine now powering this truck. At the recent showing of 1950 Pegaso models at Barcelona there was a working model of one of the new engines but it probably will be some time before production gets under way. The Pegaso display also included some new marine engines, both of the Diesel and gasoline types.

The big, two-decker passenger buses on Madrid and Barcelona streets are British Leyland chassis with Seida-built bodies, but Seida officials say that they are being increasingly handicapped by steel shortages and that unless the situation improves, they will be unable to continue operations except on a very small scale.

The "Eucort," also made at Barcelona, is a product of Fabrica de Automoviles Nacionales. A two-cylinder, two-stroke engine, which develops 23.5 hp and has a taxable rating of, 7 hp, powers this little front-wheel traction car. The three models now being produced are a four-door sedan, a two-door station wagon and another type called a "distributing van." Fabrica de Automoviles Nacionales claims to be turning out three Eucorts a day, with a total of 500 cars in operation, but it is reported that only 187 new Eucorts were licensed for operation during 1948. The manufacturers say that if they can get the steel they hope to have production stepped up within a year so that a daily output of up to ten cars will be possible.

American experts like Rudolph H. Schmidt, vice president of the Four Wheel Drive Auto Company of Clintonville, Wis., who have had the opportunity to study production methods at both the Pegaso and the Eucort plants, doubt this claim. They believe that regardless of availability of supplies the only way output can be materially increased is to introduce modern machinery and know-how.

Schmidt told this writer that the Spanish plants reminded him of "nothing so much as glorified blacksmith shops." Spaniards, he said, are not yet acquainted with the advantages of an assembly line nor do they possess the equipment for large-scale manufacture.

The largest producer of motorcycles in Spain is the R. Soriano company, whose principal assembly plant is in Madrid. Soriano, whose product carries that name, annually manufactures about 1000 motorcycles powered by a one-cylinder, 5.8 cu in. engine with a brake horsepower of three and a ¾ hp taxable rating. These little machines, with wheels only about 12 in. in diam-

(*Turn to page 72, please*)

eter and an overall weight of only 100 lb, are of the scooter type.

The second largest motorcycle manufacturer in Spain is Permanyer, S. A., of Barcelona, which produces the Montesa. The Montesa is a one-cylinder 7.6 cu in. job, has a one-hp rating, and weighs 116.6 lb.

There are two other makes of Spanish motorcycle, the Lube and the Sanglas, carrying the names of their respective manufacturers.

Lube, produced near Bilbao, is a one-cylinder, 6 cu in., one-hp machine greatly resembling the Montesa.

The Sanglas, produced at Barcelona, is a large one-cylinder job of 21.2 cu in. piston displacement and weighs 323 lb. While the Sanglas is large enough to be comparable to motorcycles of foreign makes and is regarded as a well-built machine, it is significant that the Spanish police force still relies on imported motorcycles for running down traffic violators.

Of the total of 129,660 motor vehicles registered in 1947, 61,396 were passenger cars, 42,457 were trucks, 6628 were buses and the balance were miscellaneous units such as ambulances, fire trucks and funeral coaches. American automobiles far outnumbered all other cars in operation. Ford headed the list with 21,020 registrations.

In second place was Chevrolet, with 13,776, closely pushed by Citroen with 11,409 and Fiat with 10,705. The 1947 figures showed 5584 Dodges, 4631 Renaults, 4612 Opels, 3127 Peugeots, 2229 Austins and 2110 GMC trucks licensed to operate.

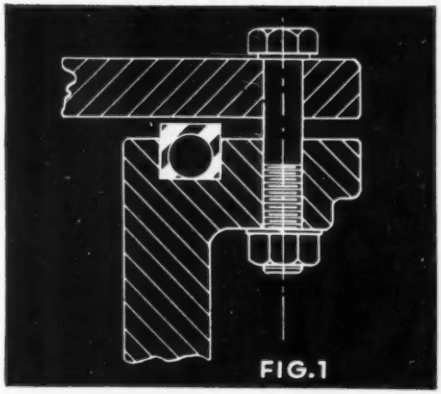
The rest of the registrations for that year contained a wide assortment of different makes of motor vehicles including 1635 Studebakers, 1498 Chryslers, 1072 Reos and 953 Essex automobiles. Plymouth showed up with 775 and there were 748 Whippets, 556 Hudsons and 553 Nash cars. Eight hundred and sixty-eight Federal and 804 Diamond trucks were licensed to run on Spanish highways. Packard had 364 registrations; Oldsmobile 346, Cadillac 219, and Buick 173. Fifty-two Rolls Royces were rolling along in majestic splendor.

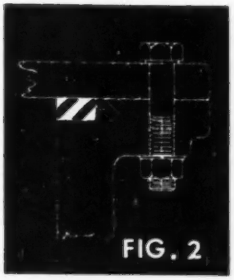
Subsequent deterioration, plus inadequate replacements, have udoubtedly brought the 1948 and 1949 registrations progressively lower than those of 1947.

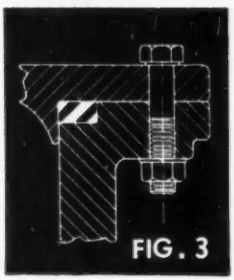
Prior to the Spanish civil war, this country imported about 6000 passenger cars and trucks from the United States every year. During World War II, American automobile imports dropped to virtually zero, partly because of shortages in the United States and partly because of the unwillingness of that country to send over motor vehicles which might end up in Axis hands. Since the end of the world war, the shortage of foreign currency here has permitted only purchases by individuals not having to secure dollars

(*Turn to page* 74, *please*)

How to reduce sealing costs with truly compressible gaskets







Sealing costs often can be reduced by using truly compressible gaskets instead of special-section molded parts. Truly compressible gaskets usually are lathe-cut or die-cut to shape. Thus costly molds are eliminated and gasket-forming costs are reduced. And since these gaskets permit wider tolerances on recesses and mating parts, the cost of fabricating and assembling metal parts may be likewise reduced.

One such application is shown in figure 1. To illustrate why truly compressible gaskets permit wider metal tolerances, it shows the relative size of a round section, noncompressible ring and the equivalent truly compressible gasket made of Armstrong's cork-and-rubber. Compressing the extra thickness of cork-and-rubber obviously would compensate for much wider tolerance variations in metal parts.

The application in figure 2 utilizes the counterbore design to reduce fabricating costs. When molded rubber rings were tried, they tended to creep out of position. Cork-and-rubber, on the other hand, deforms mostly in the direction of the applied load. Hence, it remains firmly seated and provides an effective seal.

This type of construction can also be used to seal high internal pressures when altered as shown in figure 3. The controlled sideflow of cork-and-rubber provides a tight seal on both side and top. And the wider tolerances that are possible with Armstrong's cork-and-rubber rings hold sealing costs to a minimum.

Armstrong's cork-and-rubber can be made with natural or synthetic rubber. By adding calculated amounts of compressible cork to these noncompressible rubbers, Armstrong produces compounds in which sideflow is held within specified limits.

Versatile cork-and-rubber can help reduce your sealing costs. We suggest that you discuss your application with an Armstrong representative. He can suggest suitable materials and supply samples for your experimental use.

Send for this Gasket Handbook

You'll find useful application and specification data in the new, enlarged 24-page booklet, "Armstrong's Gasket and Sealing Materials." It contains up-to-date data on synthetic rubber, cork-and-synthetic-rubber, cork composition, and fiber sheet sealing materials.

This booklet includes ten technical discussions of the factors influencing modern gasket and joint design. It also suggests methods of putting Armstrong's stock materials to specialized uses in such fields as radio, electrical, automotive, petroleum, and transportation industries. Also included are typical applications and current government specifications.

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through the Spanish Institute of Foreign Exchange.

American diplomatic officials in Madrid state that there does not seem to be any immediate prospect of a change in this situation. They say that for the next few years, few new U. S. automobiles are likely to be seen in Spain except those brought in by foreign diplomats, foreign businessmen and Spaniards lucky enough to have dollar bank accounts in America.

Most of the new passenger cars coming into Spain at the present time are being shipped by England and France. A recent trade treaty with France specifically provides for the annual export to Spain of 3000 French cars. Most of the French cars now being sent to Spain are little four-hp Renaults.

Spaniards are still buying a few trucks from the United States, but most of the trucks they have secured in recent years have been secured from England. It has been easier for Spain to secure pounds sterling than dollars, but the Spanish government is now also running very short of pounds and the outlook for imports is very bad.

The larger and more interesting aspect of the situation is to what extent the Spanish government's autonomy plan will be carried out. In collaboration with the setting up of the Fiat plant at Barcelona, the Spanish government has issued and implemented a decree whereby the Bank of Urquijo of Spain and the Fiat interests could supply together 49 per cent of the capital necessary and INI would supply the remainder up to a total capitalization of 200,000,000 pesetas. The project originally provided for the shipping of necessary machinery from Italy, but it is now believed that upwards of 75 per cent of the machinery will be provided by Spain.

Ground has already been broken for the plant and one banking source said Fiat hoped to be under production in Spain by the end of this year. However, blue prints for the factory which were sent to Italy for approval by Fiat directors have not yet been returned and even the most optimistic American expert does not believe the new plant will be able to turn out a 100 per cent Spanish automobile before 1952.

CALENDAR

Conventions and Meetings

SAE West Coast Mtg., Portland..Aug. 15-17
Conf. on Road & Motor Transportation, Geneva .....Aug. 23
Canadian Nat'l Aircraft Exhibition, Toronto .....Aug. 26-Sept. 10
Nat'l Air Races, Cleveland .....Sept. 3-4-5
Instrument Soc. of America Convention, St. Louis .....Sept. 12-16
Inst. of Traffic Engineers, Washington, D. C. .....Sept. 25-28
British Passenger Car Show, London, Sept. 28-Oct. 8
Society of Industrial Packaging and Materials Handling Engineers Annual Exposition, Detroit....Oct. 4-7
Paris Auto Show, Paris.....Oct. 6-16
Amer. Soc. for Testing Materials, Pacific Nat'l Mfg., San Francisco Oct. 10-14
Amer. Society for Metals Nat'l Metal Congress & Exhibition, Cleveland Ohio .....Oct. 17-21
Amer. Welding Soc. Annual Mtg. Cleveland .....Oct. 17-21
Amer. Inst. of Mining & Metallurgical Engineers Metals Br. Cleveland Oct. 17-21
Nat'l Safety Council Safety Congress & Exhibit, Chicago .....Oct. 24-28
Nat'l Metal Trades Assoc., Annual Convention, Chicago .....Oct. 26-28
Amer. Society Body Engineers Annual Tech. Convention, Detroit Nov. 2-4
Chicago Auto Show, Chicago.....Nov. 4-12

Machine Tool Orders Dropping Off

New orders for machine tools during April were at the lowest level since October, 1948, according to the National Machine Tool Builders Association. Index for new orders that month stood at 69.8 considerably below the 93.5 in March and 86.3 in April, 1948. Machine tool shipments also dropped with the April index standing at 74.4, compared with 75.8 in March and 82 in April of 1948.

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UNIT OF NATIONAL STEEL CORPORATION

NEW PRODUCTS

For additional information regarding any of these items, please use coupon on page 54

(*Continued from page* 48)

F-18—Bench Type Hardness Tester

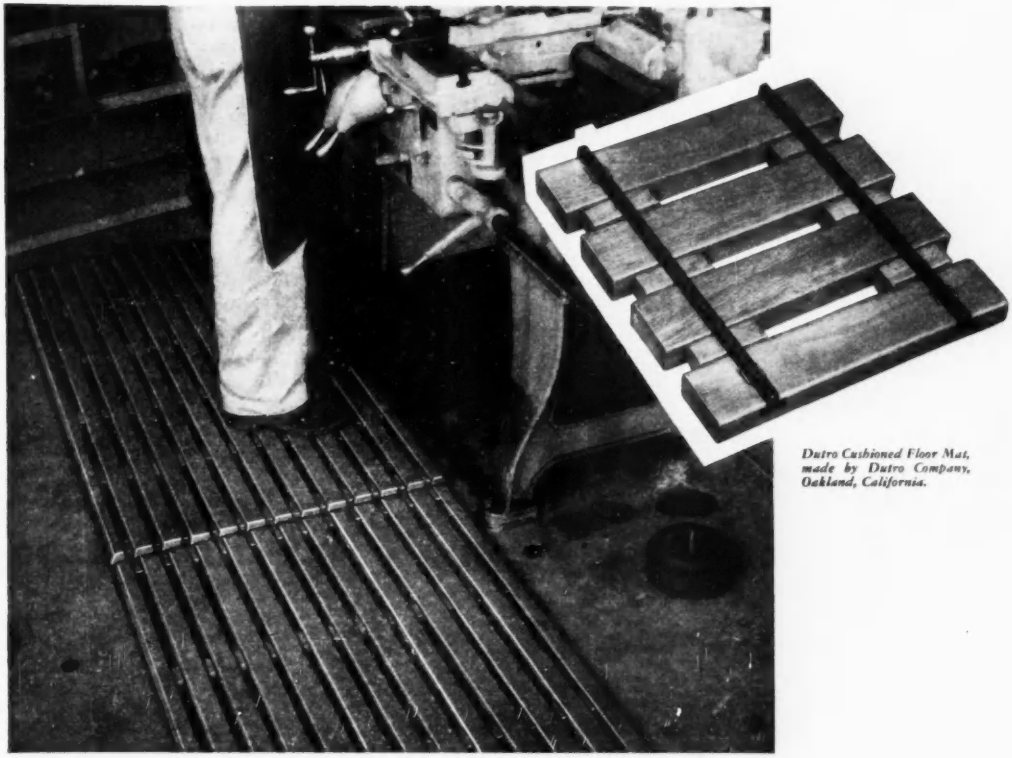
Model MO, a Tukon microhardness tester, has been introduced by Wilson Mechanical Instrument Co., Inc., an associate company of American Chain & Cable Co., Inc., New York, N. Y.

Mechanically operated, it is recommended for light load testing where there is not sufficient testing to warrant a fully automatic model. Made in both a floor and bench model, it applies loads of from 1 to 1000 grams and may be used with either the knoop or 136 deg diamond pyramid indenters. Load is applied under dash pot control, speed of which may be varied from less than 0.040 in. per min to as fast as testing permits, without impact influencing the results. Both rate of application and duration of applied load may be controlled. A special arrangement for removing the load without the operator having to touch the instrument until the indenter is out of impression is a feature for obtaining clean cut impressions not subject to distortion.

Model MO Tukon hardness tester, bench type, of the Wilson Mechanical Instrument Co.

Focusing the impression under the microscope through the elevating unit with vernier adjustment eliminates need

(*Turn to page* 80, *please*)



Dutro Cushioned Floor Mat, made by Dutro Company, Oakland, California.

It puts a cushion under foot—lowers expense too!

THESE floor mats used to lead a rough, and often a short life. The rubber binding strips on the underside wouldn't stand up under hard usage—as well as the effects of oil, grease or acid.

The makers of Dutro Cushioned Floor Mats, after tests of many rubber compounds, found that Hycar American rubber not only solved the problems, but gave them *extra* advantages.

For example, mats have been in use for three years and Hycar is still doing a first-rate job! It acts as a resilient cushion—helping reduce worker fatigue. Mats do not come apart or stretch out of shape. They protect dropped tools and parts.

These floor cushions are paying for themselves many times over in machine shops, canneries, restaurants, locker rooms and other "problem spots" where service conditions are severe.

Hycar American rubber set the pace here, as it has in so many other products, because of its versatility. It resists heat and cold, weather and wear. It's light in weight, has high tensile strength, is highly resilient. It's oil-resistant—gas-resistant. Compounds can be varied from extremely soft to bone hard, and can be made in many colors.

Hycar
Reg. U.S. Pat. Off.
American Rubber

Besides being a base material, Hycar may be used as a plasticizer . . . as a modifier for phenolic resins . . . as an adhesive . . . as a latex for coating or impregnating.

Hycar is used in practically every field, in dozens of ways. Perhaps it may answer your problem—improving a product or developing a new one. For complete information and helpful service, please write Dept. HC-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company
A DIVISION OF THE B. F. GOODRICH COMPANY

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers

New Fire-Fighting Apparatus

(*Continued from page* 43)

The radiator is mounted just back of the driver's seat. Cooling air flows from below the driver's seat through a space ahead of the radiator to the radiator core, and thence over the engine. The unique arrangement of the intercoolers is shown in the illustration. During pumping, water is circulated from the fire pump to the coil shown in the top tank of the engine radiator and then returned to the pump suction. This coil intercooler removes sufficient engine heat so that the pumper can be operated at full throttle during extremely hot weather without overheating. All engines are equipped with standard thermostats and manually operated winter fronts for fast cold weather warm-up.

It will be noted that an oil cooler coil is located in the bottom tank of the radiator. The engine oil is pumped through this coil and then to the engine oil gallery. This effectively speeds the warm-up of the engine oil in cold weather and maintains safe oil temperatures during full throttle operation in hot weather. Locating the oil cooling coil in the bottom tank of the radiator submits the hot oil to the cooling action of the lowest temperature water in the cooling system while locating the intercooler coil in the top tank subjects the highest temperature water in the cooling system to the cooling action of water from the fire pump.

All American-LaFrance fire apparatus is powered with V-12 type engines that are engineered and manufactured within our plant. These engines feature Tocco hardened crankshaft journals, copper-lead bearings, aluminum alloy pistons, and valve in head design.

A twin lever shift arrangement is employed under the driver's seat to insure a positive shift action. This parallelogram motion in conjunction with the remote control rods that extend forward from the road transmission control tower have provided an easy and reliable shift. By means of this twin lever arrangement, the shift lever is located in the most convenient location for the driver.

The chassis frames are of welded construction and employ deep section plain carbon steel rails to obtain rigidity and eliminate the problem of welding heat treated rails. Welded gussetts and cross members provide more joint stiffness than riveted construction.

The road transmission power take-off gears are used to drive the aerial ladder truck hydraulic pump and in some cases a booster pump. This use of the power take-off gears is typical of automotive take-off arrangements.

The fire pumper must have a large capacity pump mounted in the chassis so that engine power can be applied to the pump shaft. This is accomplished by mounting the pump transmission in the main line of drive immediately behind the road transmission. The road transmission and the pump transmission are connected by a close coupled universal joint. The pump transmission incorporates a sliding gear shift so that the rear axle drive can be disconnected and the pump drive engaged.

Australia to Import 15,800 Tractors

Australia will import 12,000 wheel tractors from the United Kingdom and 3800 from the United States during the year ending June 30, 1950, according to the Dept. of Commerce. In sharp contrast, average annual imports of this type of tractor over a six-year period immediately preceding World War II were 3913.

Iceland Now Has 11,000 Automotive Vehicles

The number of automotive vehicles in Iceland is now about 11,000, compared with 7728 registered on January 1, 1947, the Dept. of Commerce reports.

Galvanizing Output Up 70%; Micromax Control Gets Credit For Help

The galvanizing operation above is being performed at Clayton Mark & Co., Illinois manufacturers of water well supplies. Typical of the work handled is the pump intake screen shown here, which requires a first-rate job of controlled-temperature galvanizing.

To supplement their own recognized "know-how," Clayton Mark recently took Micromax Pyrometers into "partnership." Now, with operators freed from all routine temperature watching, they can devote full time to actual handling of the work. Competent workers are not only made more effective; the job is easier, results more accurate. Daily production per kettle has gone up 70% and the life of furnace refractories lengthened 100%.

Two Micromaxes Handle Control Problem

These results were achieved by using two Micromax Pyrometers. One, a recording instrument, controls bath temperature. The other, a non-recording controller, prevents the combustion chamber from overheating by shutting down the fuel line if chamber temperature rises enough to endanger the refractory, burners, etc. Working as a team, these instruments overcome the effect of temperature "time lag"—unavoidable in this process as well as many others. The operator simply "tunes" the pyrometers to process needs; they bring the zinc bath up to temperature and hold it "on the line" steadily, smoothly.

For further information about Micromax Electric Control for any application, write to Leeds & Northrup Company, 4966 Stenton Ave., Philadelphia 44, Pa.

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LEEDS & NORTHRUP CO.

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NEW PRODUCTS

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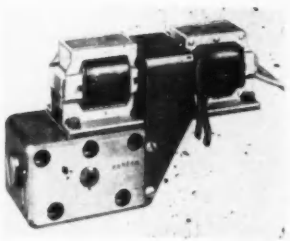
(Continued from page 76)

for coarse and fine adjustment on the microscope. Load is applied in a manner which eliminates necessity of bringing the elevating screw to any reference marks, trial settings, etc. The Microton (a specially designed mechanical stage for making indentations in selected small areas) is used for accurately locating the indentations. The Microton is supplied as standard equipment. 110 volts, 50 or 60 cycles AC illuminates the microscope.

F-19—Solenoid Control Valve

The John S. Barnes Corp., Rockford, Ill., brings to attention their type 89 series solenoid control valves for oil hydraulics used to control remotely by electrical means the direction of flow to and from a double acting cylinder or fluid motor. This type 89 double solenoid directional control valve is the smallest of the line of Barnes 4-way valves which continues up to the 1½ in. size.



Barnes type 89 series double solenoid 4-way directional control valve

Positive in action, the valve is detented in both positions. Close grain electric furnace iron body is provided with a hard nitralloy stem. The stem is ground and lapped to fit the body. All grooves are machined, allowing positive action and consistent results from all valves.

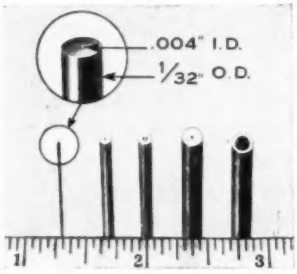
The valves are tested for an internal leakage of less than 2C.I.M. at 500 psi. External leakage is prevented by the tight fitting stem and by means of "O" rings at the manifold face. Valve is complete, including a gage port. The solenoids are Barnes standard, used on all sizes of valves.

The valves are widely used on Barnes self-contained hydraulic units and also as components on a wide variety of machine tool circuits. Due to the small size solenoids the shifting is smooth and does not result in hammering action, the company states.

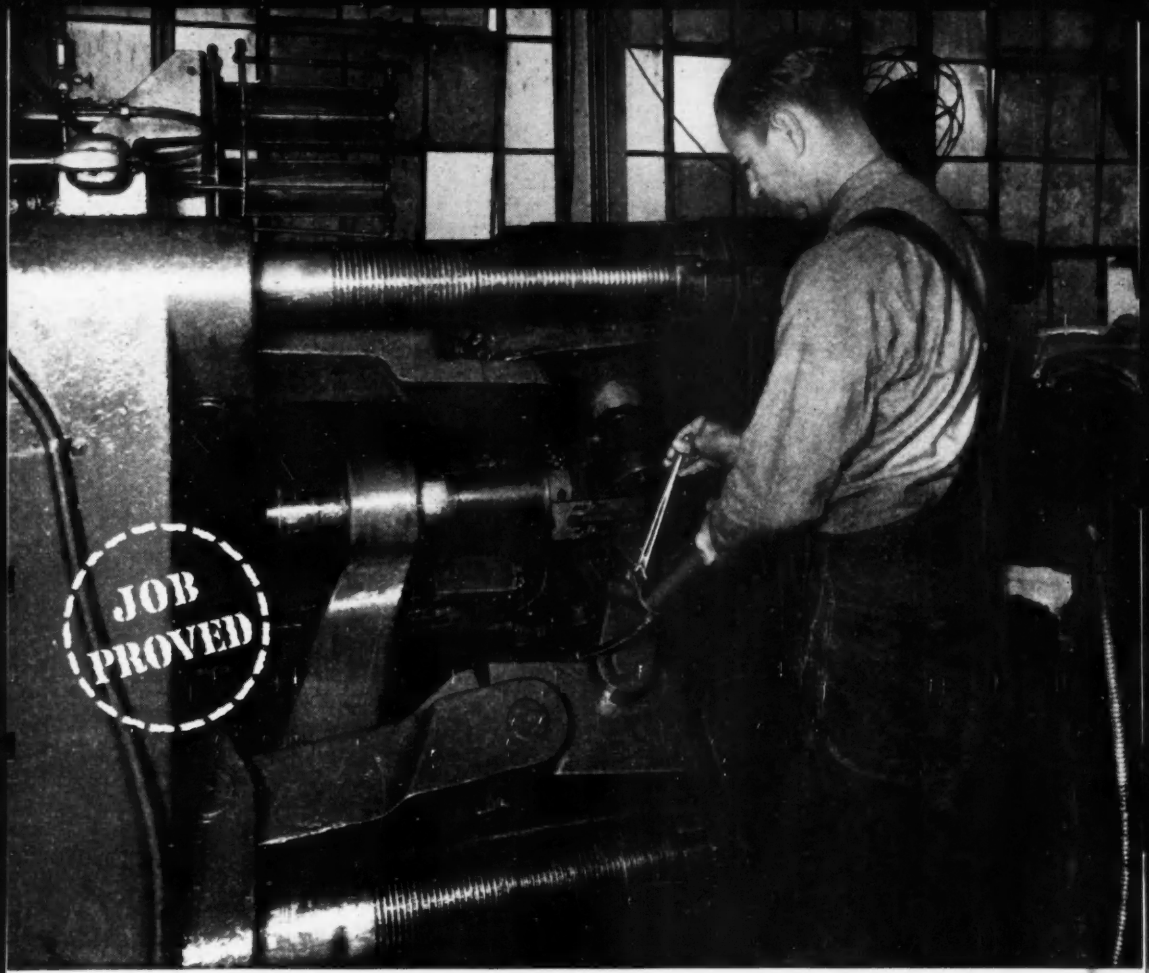
F-20—Cemented Carbide Tubes

Cemented carbide tubes as small as 1/32 in. O.D. with an I.D. of 0.004 in., and as large as 9/16 in. O.D. with a wall thickness of 1/16 in., are being extruded by Kennametal Inc. of Latrobe, Pa. Even still smaller or larger tubes, and those having a greater

(*Turn to page 82, please*)



Extruded shapes of solid Kennametal offered by Kennametal, Inc.



$300 SAVED IN "PIN" MONEY

Sun Lubricant Reduces Toggle Pin Wear 70% and Minimizes Shutdowns in Die-Casting Plant

In injection-molding zinc die castings, a manufacturer was experiencing excessive wear and breakage in toggle pins. The lubricant in use, which was applied to the pins by gun, just couldn't stand up under heavy-duty operation.

Asked for his advice, a Sun engineer recommended a grease which had been "Job Proved" in many machines of the same type. Over a period of 14 months, use of this Sun grease resulted in 70 percent reduction in breakage of pins. Translated into hard cash, this represented a $300 saving. In addition, costly shutdowns for pin replacement were greatly reduced.

Records like this are not unusual in plants where Sun "Job Proved" greases and oils are used. You can rely on these lubricants to help keep equipment operating steadily and safely, with minimum time-out for maintenance. For the booklet "What Makes a Good Grease," write Dept. AA-7.

SUN OIL COMPANY • *Philadelphia 3, Pa.*
In Canada: Sun Oil Company, Ltd.
Toronto and Montreal

SUN PETROLEUM PRODUCTS SUNOCO

"JOB PROVED" IN INDUSTRY

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For additional information regarding any of these items, please use coupon on page 54

(*Continued from page* 80)

range in relative dimensions, are said to be commercially possible.

The O.D. is rough extruded 0.010 to 0.015 in. oversize, and the I.D. is held to ±1 per cent of specified size, accurately concentric. Ratio of I.D. to O.D. may cover a wide range, i.e., either a relatively thin or thick wall.

These tubes can be supplied in either of two classes of Kennametal.

One is straight tungsten carbide, having the high hardness common to this material, combined with unusual strength. It is suitable for parts subjected to abrasion at normal temperatures, such as wire and thread guides, orifices, nozzles, punch and die parts, gage elements, etc.

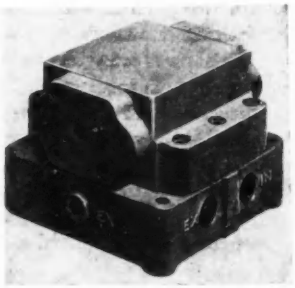
The other is essentially titanium carbide, having a hardness comparable to tungsten carbide, but a much less weight. Chief distinguishing property is that it withstands corrosion and abrasion at elevated temperatures that rapidly disintegrate cast alloys. Its resistance to thermal shock is higher than that of ceramics. Tubes of this high temperature material find application as furnace rollers, guide bushings for hot rods, nozzles, burner cones, thermocouple protection tubes, etc. The transverse rupture strength of this class tube at 1800F is 100,000 psi.

F-21—Spool Type Four-Way Valve

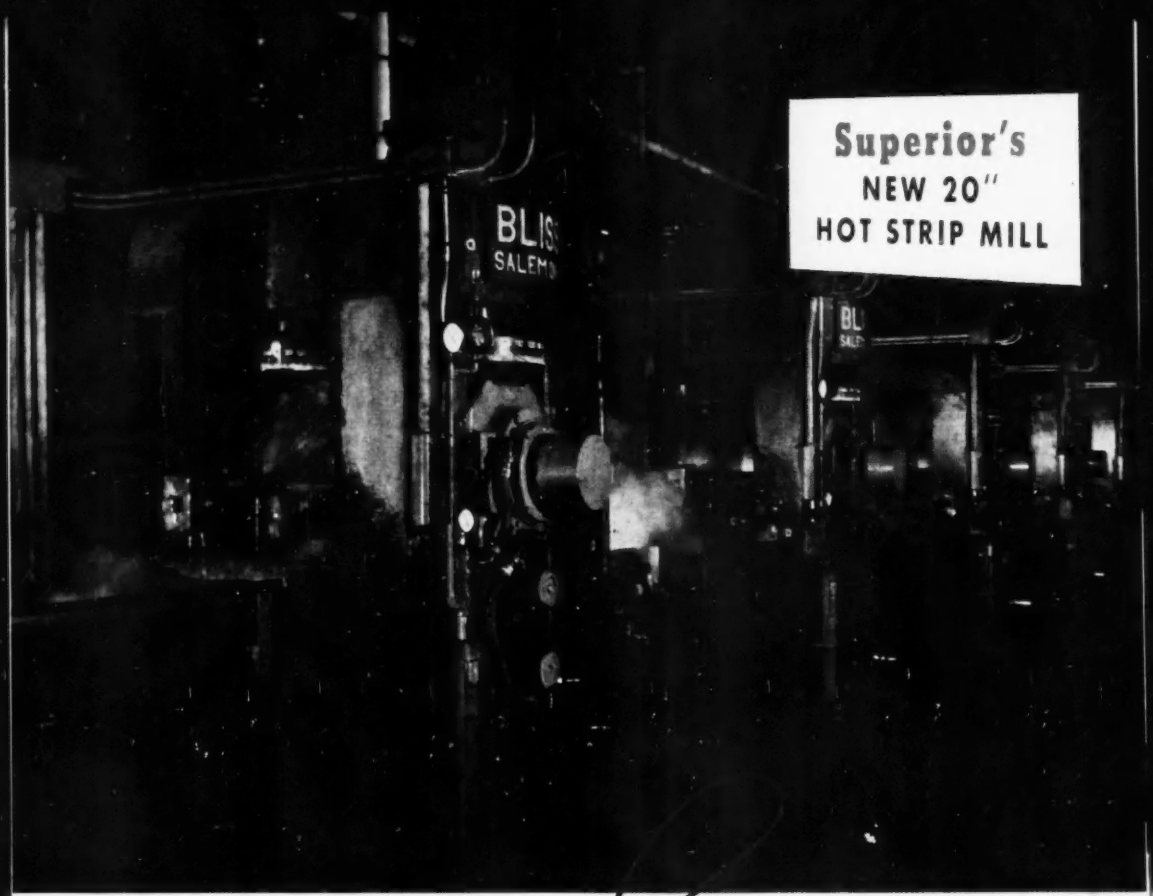
A new 4-way Mastair valve of the balanced spool type, controlled by one 4-way or two 3-way pilot valves, has been announced by Hanna Engineering Works, Chicago, Ill.

Because of straight line piping, few fittings are needed. The pipe may be connected to bottom or sides as desired.

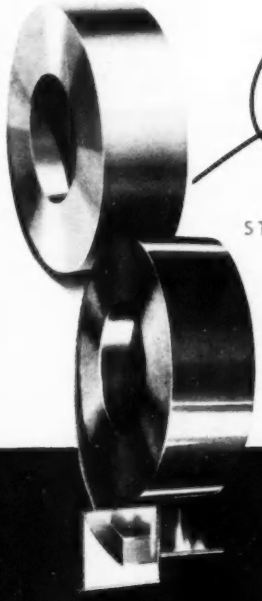
(*Turn to page* 85, *please*)



Hanna 4-way Mastair valve



OVER 50 YEARS OF *Specialization* IN STRIP STEELS



STAINLESS

SPRING STEELS

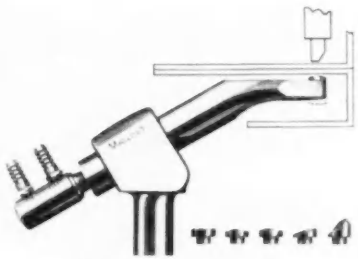
CLAD METALS

ALLOYS

Specialization, in the fundamental Superior way, extends throughout our plant facilities, our research and our manufacturing techniques . . . to the sole end of producing finer strip steels for our customers. Our new plant installations, —including the Hot Mill shown above, cold rolling mills, and strip handling and storing facilities—signify faster, better service over a wider market range. • Let us detail the benefits to *you* of Superior specialization!

Superior Steel
CORPORATION
CARNEGIE, PENNSYLVANIA

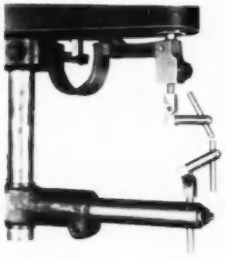
There's No Holding
MALLORY
For Resistance Welding Electrode
HOLDERS



The Paddle Type Holder

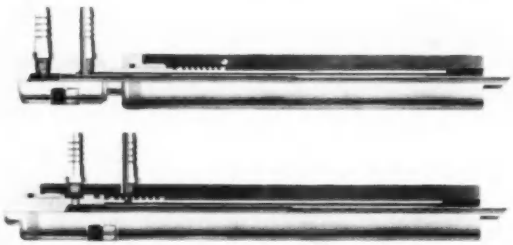
Here's a new design specially created to get at confined, inner recesses. It permits a variety of positions to speed up operations in inaccessible places. Standard button-type tips of various designs can be used on top or bottom of the holder.

Those who know resistance welding know they can depend on Mallory for holders specially designed and proved to do better jobs. Put these new proved designs to work for you without delay. Write for additional information.



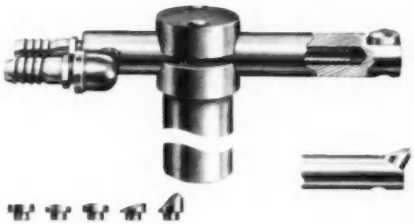
The Bench Type Holder

Here's another big "first" from Mallory—the only holder for bench type resistance welding that offers complete versatility in adjustment using standard packaged electrodes. Has 180° range of head adjustment, positive locking under full operating pressures. Eliminates need for special hand-made tips.



The "KO" Leak-Proof Holders

Another piece of welding history written by Mallory is this line of leak-proof holders. Uses standard size O-Rings in place of ordinary packing. Complete assembly, including internal parts, made of copper alloy, brass or stainless steel. Prevents rust or corrosion that could interfere with water flow or easy ejector action.



The Light-Duty Universal Offset Holder

Here's the light duty holder that is Mallory's solution to getting at those hard-to-reach spot welds. Incorporates standard button-type tips of various designs. Efficient water cooling insures maximum tip life under severe conditions.

A complete research laboratory and engineering department equip Mallory to serve you best. See Mallory first—*and get the* best!

Resistance Welding Tips, Holders, Dies, Rod and Bars, Castings, Forgings

P. R. MALLORY & CO. Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

SERVING INDUSTRY WITH

Capacitors — Rectifiers
Contacts — Switches
Controls — Vibrators
Power Supplies
Resistance Welding Materials

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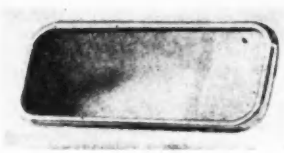
(*Continued from page 82*)

Parts may be removed without disconnecting the pipe. Spool and sleeve assembly is easily taken out by removing end caps. Parts are interchangeable in any size. Capacities of ⅜ in., ½ in., ¾ in. and 1 in. are of fully rated pipe size. Control pilot valves are available in cam, lever, push-button and foot operated types.

F-22—Polarized Rear View Mirror

The first and only polarized rear view mirror for glare-less vision has been placed on the market by Sparton Automotive, Division of The Sparks-Withington Co., Jackson, Mich., under the name of Sparton Polavision rear view mirror. This improvement absorbs the glare reflected from the rear by the sun in the daytime and the glare from lights at night.



Sparton polarized rear view mirror

Light reflected from the Sparton Polavision rear view mirror is toned down so that only 16.5 per cent of the light striking it is reflected into the driver's eyes. An ordinary rear view mirror reflects 70 per cent of the light, and even mirrors darkened by standard "no glare" methods reflect about 40 per cent of the light, the company states. The Polavision rear view mirror also tones down the brilliant reds, disturbing yellows, whites and blues, and cuts down the reflection of harmful infra-red and ultra-violet rays, giving a sharper image.

F-23—Line of Oil Pilot Valves

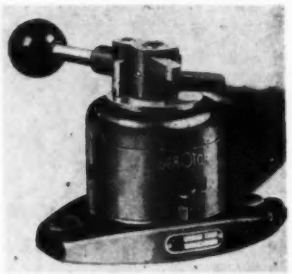
A new line of oil pilot valves, Series 7000, offered by Gerotor May Corp., Baltimore, Md., are used for remote control of oil pressure operated 4-way hydraulic valves. Operational control is gained in these valves by a fork lever design, which, when actuated by a moving part of the device being powered,

(*Continued on next page*)

NEW PRODUCTS

For additional information please use coupon on page 54

permits the remote reversing of the main 4-way valve. Both fork lever and fork and hand lever types are supplied (illustrated). The latter permits manual interruption of the cylinder's forward or return stroke at any time.



Gerotor May oil pilot valve, Series 7000

Four standard mountings are available—pipe-line, base, foot, and panel. Gerotor oil pilot valves may be had with all ports blocked in neutral, all ports open to exhaust in neutral, and cylinder ports open to exhaust and pressure port blocked in neutral.

F-24—Diesel Engine Starting Fluid

An interesting solution for starting Diesel and gasoline engines in cold climates by initiating combustion is offered by the Standard Oil Company of California, in its Chevron starting fluid, developed by the California Research Corp., during the last war. The present method of packaging, permitting installation of a self-contained priming system, was developed by the California Oil Company of Barber, N. J.—both organizations being wholly owned subsidiaries of the Standard Oil Company of California.

Basically an ethyl-ether compound, Chevron starting fluid is packaged in gelatine capsules in two sizes—7 cc and 17 cc—insuring safe handling and freedom from the hazards attending use of the fluid in bulk form. The fluid has an ignition temperature of 370 F and flows at minus 70 F. It contains an auxiliary lubricant, corrosion inhibitor, and anti-freeze. As packaged, it is red in color.

The development of this material stems from war time operations particularly in Alaska. It is claimed that Diesel engines have been started in less than 10 seconds at minus 50 F.

The Chevron installation consists of

FOR A GOLDEN FLEECE

The Great Adventure of modern industry is no less dramatic than the mythical deeds of pre-Homeric heroes. Fighting for profits against devouring costs isn't unlike facing a dragon that guards a Golden Fleece.

Manufacturers throughout the world know Clearing presses as effective weapons against treacherous costs. Press methods are inherently economical, and Clearing presses keep operating costs at a minimum.

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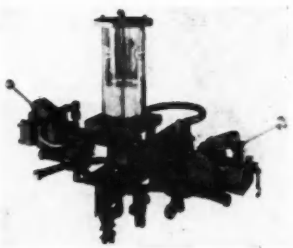
a cylinder containing the puncturing tool, into which the capsule is inserted. In addition, there is a primer on the dash and an injection nozzle or nozzles fitted in the intake manifold. This equipment may readily be installed by the operator, although factory installation by the engine or machine or truck manufacturer is a future anticipated development.

F-25—Conveyor Bearing Lubricator

A simplified self contained grease lubricator for conveyors of the type that requires no external power for its operation and is driven by contact with the trolley wheels, is a product of J. N. Fauver Co., Inc., Detroit Mich. Identified as Model 304, it employs castings throughout, including the cams, and provides a transparent plastic reservoir serving also as a liquid level gauge. Lubricator design gives the option of spring follower or air pressure operation on the reservoir for forcing the lubricant into the pumping units.

As a trolley wheel approaches the lubricator the hub engages the sleeve



Fauver grease lubricator, Model 304

of one of the five pumping units which is thus automatically brought into contact with the wheel bearing. Continued rotation of the lubricator forces the pumping unit inward, delivering a measured quanity of lubricant through the fitting to the wheel bearing.

Thus one trolley wheel is greased and a cam located in the pump housing snaps the next pumping unit into exact position to contact the next wheel as it comes along. This process is continuous, as long as the conveyor is in motion. Pumping units are constantly supplied with lubricant from the reservoir. The lubricator operates on conveyor wheels equipped with, or without Zerk hydraulic fittings.

Automatic Grinding OF LARGE CASTINGS in 1/7th OF THE TIME!

NEW No. 936 Vertical Spindle BESLY Rotary Surface Grinder

Per-piece grinding time cut from 96 to 13 minutes, a 7-fold improvement — Automatic operation for savings on costly expert labor — Modern design to cut maintenance — A minimum of pre-setting!

These are the spotlighted results achieved by this new Besly grinder, now used by a Texas company in grinding gates for high pressure oil lines. Tests show this grinder equally efficient on fifth wheel castings, small gas engine bases, fluid drive transmission housings and many other types of work.

Here again, Besly experience in grinder design, engineering and manufacture has served to produce *improved* grinding in less time and at *lower* cost. Beating high costs today on production grinding means modern grinding equipment, built by experts to meet your specific needs.

When you call on Besly you get the benefit of more than 50 years accumulated experience — the kind of help that means more production profit at lower cost on grinding.

CHECK THESE PRODUCTION BOOSTING, MONEY-SAVING FEATURES OF THE No. 936

- **Vertical, Single Spindle** — using 42" diameter abrasive ring above a rotating table.
- **Entire Spindle Assembly** — raised or lowered by feed screw.
- **Quick, Easy Loading Table** — slotted for secure holding of work with bolts. Operates at any speed from 1 to 6¼ RPM.
- **Automatic Operation** — after table is loaded and controls adjusted.
- **Pendant Control Box** — within easy reach of operator.
- **Motors, Bearings, Cylinders** — all designed to operate at highest efficiency with minimum power and maintenance requirements.

TITAN WHEELS

Here's a valuable source of information on modern grinding wheels and abrasives with all the facts on Besly Titan Steelbacs to save "down time." Write for your copy today!

Maybe GRINDING is the Better Way... Better Check with BESLY

BESLY GRINDERS AND ACCESSORIES
BESLY TAPS • BESLY TITAN ABRASIVE WHEELS

CHARLES H. BESLY AND COMPANY • 118-124 N. Clinton St., Chicago 6, Ill. • Factory: Beloit, Wis.

GMC Large Engine

(*Continued from page 32*)

heavy duty oil bath air cleaners mounted on the right side of the engine are connected to the carburetor with a large cast aluminum pipe.

Speed control is afforded by the installation of the Centri-Vac, mechanically driven, vacuum-powered governor, said to give positive control according to the pre-setting.

A two-cylinder, vertical type, Westinghouse air compressor of 12 cu ft capacity is mounted on the left side, driven by V-belt from the water pump pulley. It is swivel mounted to permit drive belt take-up.

Electrical equipment supplied by Delco-Remy includes — a 12-volt starting motor; a two-pole generator with external voltage and current regulator; distributor with full automatic spark control, of dustproof construction and single breaker type. The distributor is driven from the camshaft through helical gears at half engine speed. It also contains the flange and drive gearing for the engine governor control valve, and the tachometer take-off. The ignition coil is oil-insulated, heavy duty, 12-volt type, having a threaded type high tension terminal. Spark plugs are of AC, type 44 commercial, with gap setting of 0.028 to 0.032 in.

National Truck Trailer Show

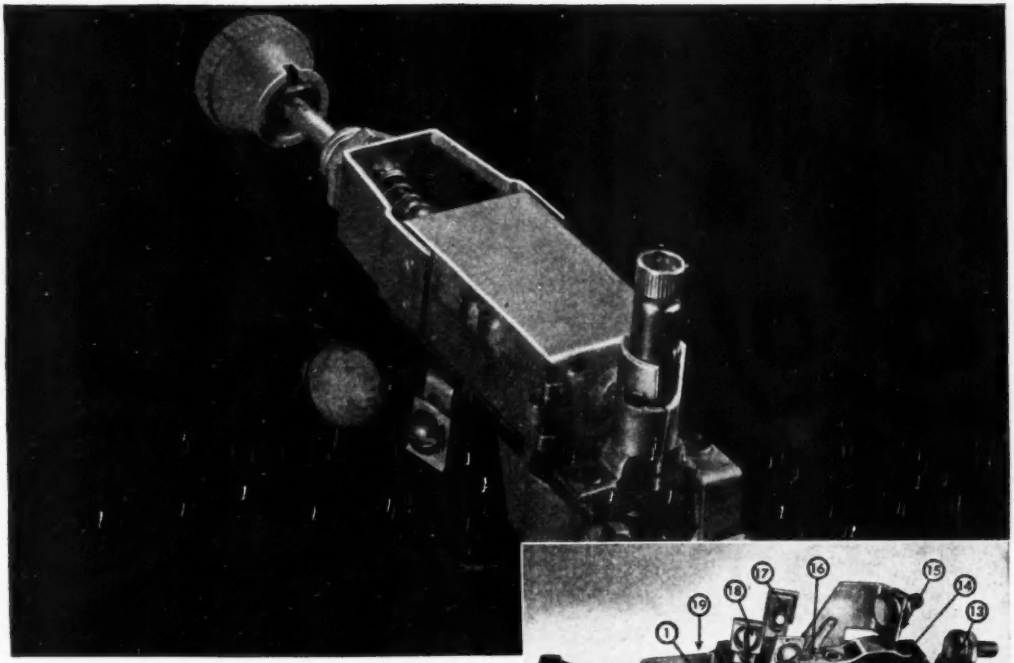
(*Continued from page 33*)

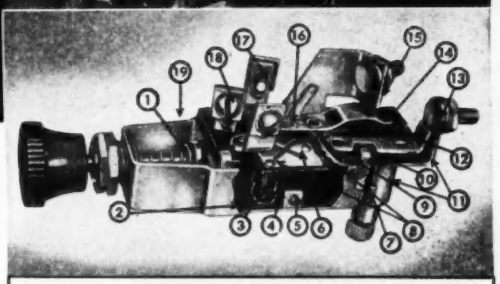
nesium flooring. The company also displayed a new "frameless" tank trailer. A 10-ton capacity hydraulic boom crane that can be mounted on a motor truck and used for loading other trucks and trailers, and for setting telephone poles was exhibited by Crescent Tool Co., Long Beach, Calif. Reo Motors, Inc. made its first public showing of the new Reo Model 31D Diesel, using a Cummins HRB 165 hp engine. The new truck is available in various wheelbases of both single and dual axle drive tractors or trucks.

Exhibitors reported many orders taken and were very enthusiastic about the show, C. T. Thomas, general chairman, and manager, automotive equipment, Marketing Department, General Petroleum Corp., told AUTOMOTIVE INDUSTRIES. The show was so successful that every exhibitor has already requested space for next year, with three-quarters of them desiring larger space. The Los Angeles Automotive Council sponsored the show.

REVERE MATERIALS + COLE-HERSEE DESIGN ASSURE DEPENDABLE HEADLAMP OPERATION

(Sixty Percent of All Automobile Accidents Occur After Dark)





Three-Position Heavy Duty Headlamp Switch, made by Cole-Hersee Company, 20 Old Colony Ave., Boston 27, Mass.

1. Spring Backed Dustproofed Gland
2. Heavy Steel Case and Bracket
3. Four Separate Contact Springs
4. Moulded Bakelite Contact Carrier
5. Double Independent Action
*6. Heavy Gauge Phosphor Bronze Contactor
7. Interlocking Back Prevents Short Circuiting
*8. Silver Inlaid Phosphor Bronze Contacts
9. Canvas Base Bakelite
10. Six Clinching Ears
11. One Piece "Hot Wire" Conductor
12. Heavy Reinforcement and Thrust Stop
13. Terminal Studs Welded to Conductors
*14. Heavy Gauge Phosphor Bronze Spring Contacts
15. Heavy Conductor and Thrust Stop
*16. Silver Inlaid Phosphor Bronze Contact Rivets
17. Heavy Gauge Screw Terminals
18. Shakeproof Lockwashers With Locking Tail
19. Bracket Extension To Clear Dash Obstructions

*Parts starred are made of Revere Metals

HERE is a picture and sectional view of a device frequently used by motorists, who know nothing about it except that it has a knob and works perfectly when pushed or pulled. It is a Cole-Hersee three-position light switch: Off, Parking Lights, Headlights.

Because such a switch is so reliable and long-lived, one might suppose it to be simple. It is far from that. Its operation, however, is simple, and is protected by design and materials which foresee the conditions and contingencies of use.

Note the variety of the materials. They include steel in several types and forms, brass, phosphor bronze, canvas base bakelite, a felt washer to exclude dust, plastic, and if you include the fuse, lead and glass. In the list of features the four items starred are made of Revere Metals.

This is an excellent example of the manner in which wise manufacturers employ Revere Metals. Both they and we realize that every metal and material has its individual qualities and applications. When these are understood and chosen with full regard for conditions of fabrication and use, a fine product has been given its fundamental guarantee. It is one of the important duties of Revere Technical Advisors to collaborate in the selection of the many different Revere Metals. If you would like to obtain the benefits of this service, get in touch with the nearest Revere Office.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.—Sales Offices in Principal Cities, Distributors Everywhere.

Machine Tool Builders Hold Exhibit

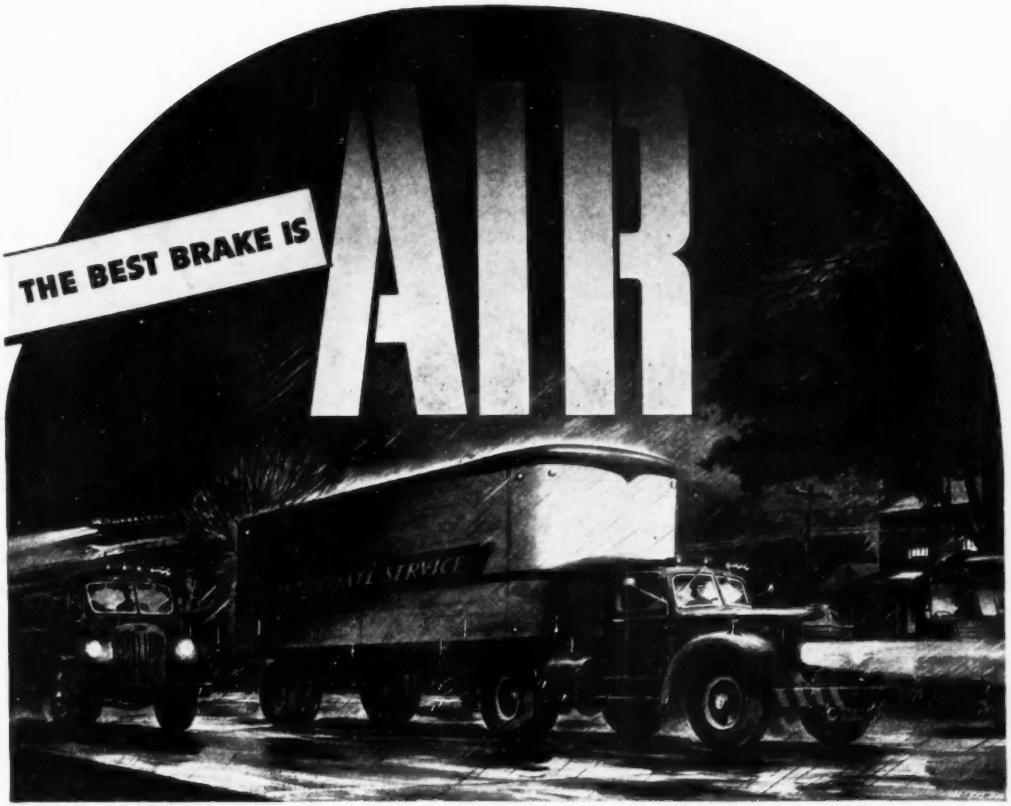
(*Continued from page 35*)

radius on the workpiece in 30 seconds, floor to floor; the second lathe turned the OD and faced the other end in 25 seconds; while the third machine formed a groove and corner radius in 15 seconds. In another demonstration, a rear axle drive pinion forging was turned, faced and chamfered in 17 seconds, floor to floor.

Single-spindle, four-spindle, and six-spindle Conomatic bar machines were demonstrated at the five-acre plant of Cone Automatic Machine Co. Shown for the first time was a five-in. single spindle bar machine equipped with a combination electronic mechanical drive to tool slides. Its work spindle speeds range from 85 to 784 rpm with a selectivity of 51 speeds. There is an unusually large diameter, lengthy heavy main end slide turret assembly. Five slides of flat, rectangular type are supported by the turret and provide the five endworking positions. Each end slide is actuated by an electronic application which controls its stroke and feed independently of the mechanical drive of the cross slides. Stroke and feed may be changed during the cutting operation. Swing of the slides is five in. from the center line. An interesting feature of the turret is its facility to impart a movement to the end slides which will produce side forming or recessing cuts, within certain limits, without need for special equipment or attachments. The working movement of any end slide can be reversed by pushbutton control.

Also featured at the Cone exhibit was a five-in., four-spindle Conomatic, Model KL, a very heavy duty machine weighing 40,000 lb, designed for flexibility of changeover to handle short, medium or long runs. It offers four full provision endworking positions for any type of endworking tools, including sufficient swing capacity to accommodate any standard die head for threading to the full five-in. capacity, a standard equipment length of stock feed for feeding up to 10 in. maximum, and a working travel of the main end slide of four in. maximum and a total travel of 10 in. All tool slides, cross slides and end slide have variable work stroke facility without cam change. Dials with graduations provide immediate change. Both main end slide and cross slides receive their actuation from cams that are positioned close to the slides.

Many of the nearly 600 industrialists as well as Army and Navy officers and government officials in attendance were of the opinion that this Springfield-Windsor show may be only the beginning of a series of regional exhibitions of similar character to be held before the machine tool builders are again ready to put on a large national show.



Maximum Protection for Truck, Load, Owner and Driver

On any hauling job, rain or shine, day or night—when you need your brakes suddenly, only the best are good enough. And that means Bendix-Westinghouse Air Brakes. Because, Bendix-Westinghouse is the oldest and largest manufacturer in the field. Every Bendix-Westinghouse Air Brake device is designed, built and tested with the same painstaking care that goes into your truck, to give you the finest braking protection money can buy. That's not all, Bendix-Westinghouse Air Brakes are economical, quickly paying for themselves in savings on maintenance costs. So, safeguard your business, equipment, and yourself, with the world's safest power-to-stop—Bendix-Westinghouse Air Brakes.

THE BEST AIR BRAKE IS

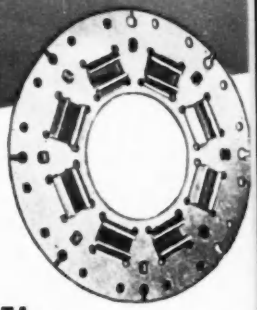
Bendix-Westinghouse

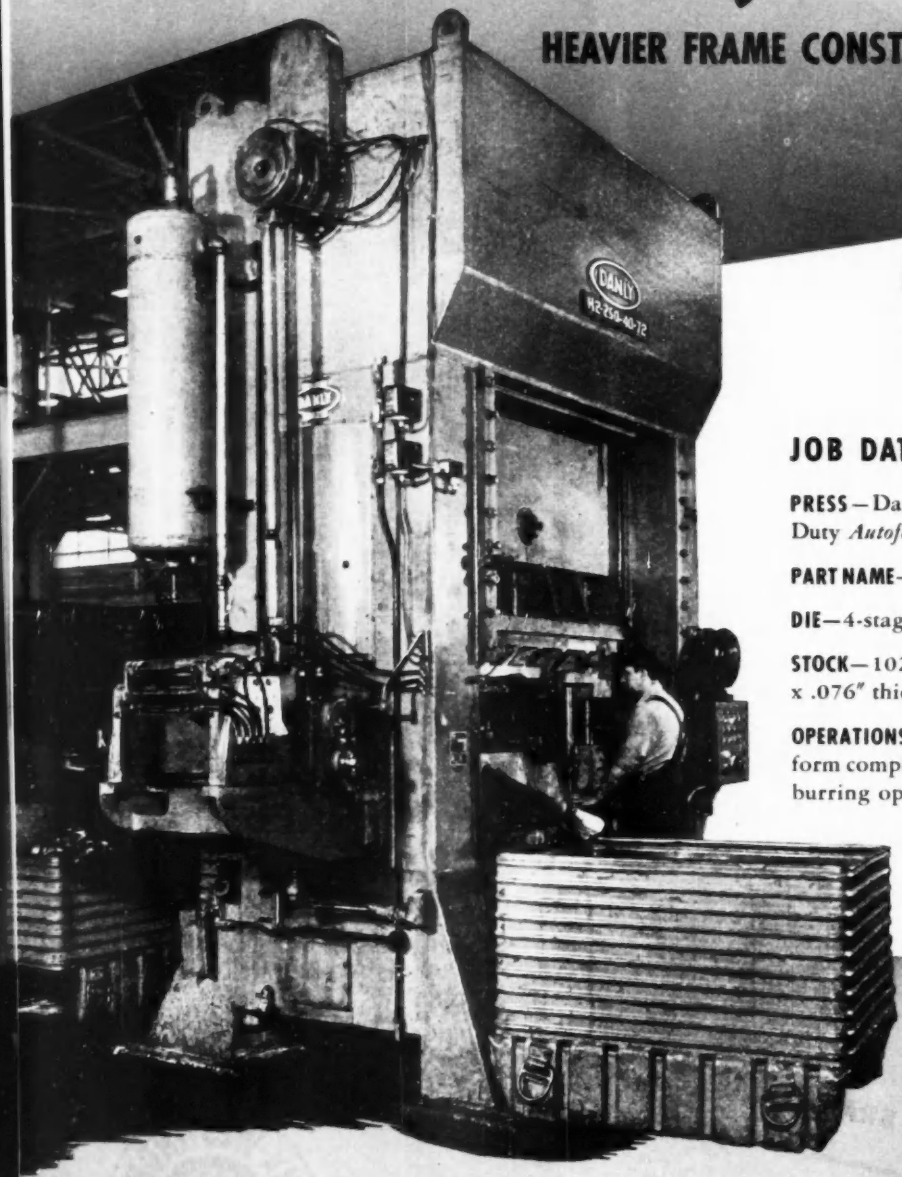
BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE COMPANY
ELYRIA, OHIO

BENDIX-WESTINGHOUSE AIR BRAKES
REG. U.S. PAT. OFF.

FASTER SPEED OF *Autofeed* PRESS

HEAVIER FRAME CONSTRUCTION





JOB DATA:

PRESS—Danly 250-ton Heavy Duty *Autofeed*

PART NAME—Clutch driven plate

DIE—4-stage progressive

STOCK—1020 CRS, 6⅛" wide x .076" thick, coil.

OPERATIONS—Blank, pierce and form complete. (No subsequent burring operation required)

This Danly 250-ton Heavy Duty Autofeed press produces both finished stampings shown on the inspection table (opposite page). Formerly, each stamping was made on a separate press.

DANLY

DANLY MACHINE SPECIALTIES, INC.
2100 S. 52nd AVENUE, CHICAGO 50, ILLINOIS

MECHANICAL PRESSES

INCREASES PRODUCTION...TRIPLES DIE LIFE

REDUCES VIBRATION AND BED DEFLECTION

PERMITTING LONG RUNS AT HIGHER SPEED

THIS AUTOMOTIVE stamping was formerly produced on a press of the same tonnage at 20 strokes per minute. Now, on a Danly Heavy Duty *Autofeed* press, the speed has been tripled to 60 strokes per minute. In addition to increasing production, three times as many parts are produced between die grinds, and burring has been substantially reduced. Quality has been improved while reducing direct production costs.

All Heavy Duty *Autofeed* presses are designed throughout for faster, automatic stamping of parts. The entire frame is constructed heavier for the rated capacity of the press, reducing vibration at higher operating speeds. The result is longer uninterrupted runs, better die performance and higher product quality.

Production Increased—Heavier frame construction permits taking full advantage of automatic feed through progressive dies completing numerous operations in one press. Handling is reduced—one press does the work of several presses.

Maintenance Costs Reduced—The Danly air-cooled, air-operated clutch and brake operate for prolonged periods without maintenance. Friction discs responsible for clutching and braking action are not subjected to the disintegrating effects of high temperatures.

Automatic lubrication flushes all bearings in crown and slide, including gibs, substantially increasing the prime life and top performance of the press.

EXCLUSIVE DANLY FEATURES POINT TO LOWER STAMPING COSTS

Die Tryouts Facilitated—Special Danly controls and unusual clutch sensitivity inherent in Danly design permit closer, more accurate "inching" during die tryouts. This saves time and adds safety in getting dies spotted and in production.

Inspection operation showing both clutch plates and lamp mounting brackets in place on gages. These parts are alternately produced on the Danly Autofeed Press.

WRITE FOR COMPLETE INFORMATION

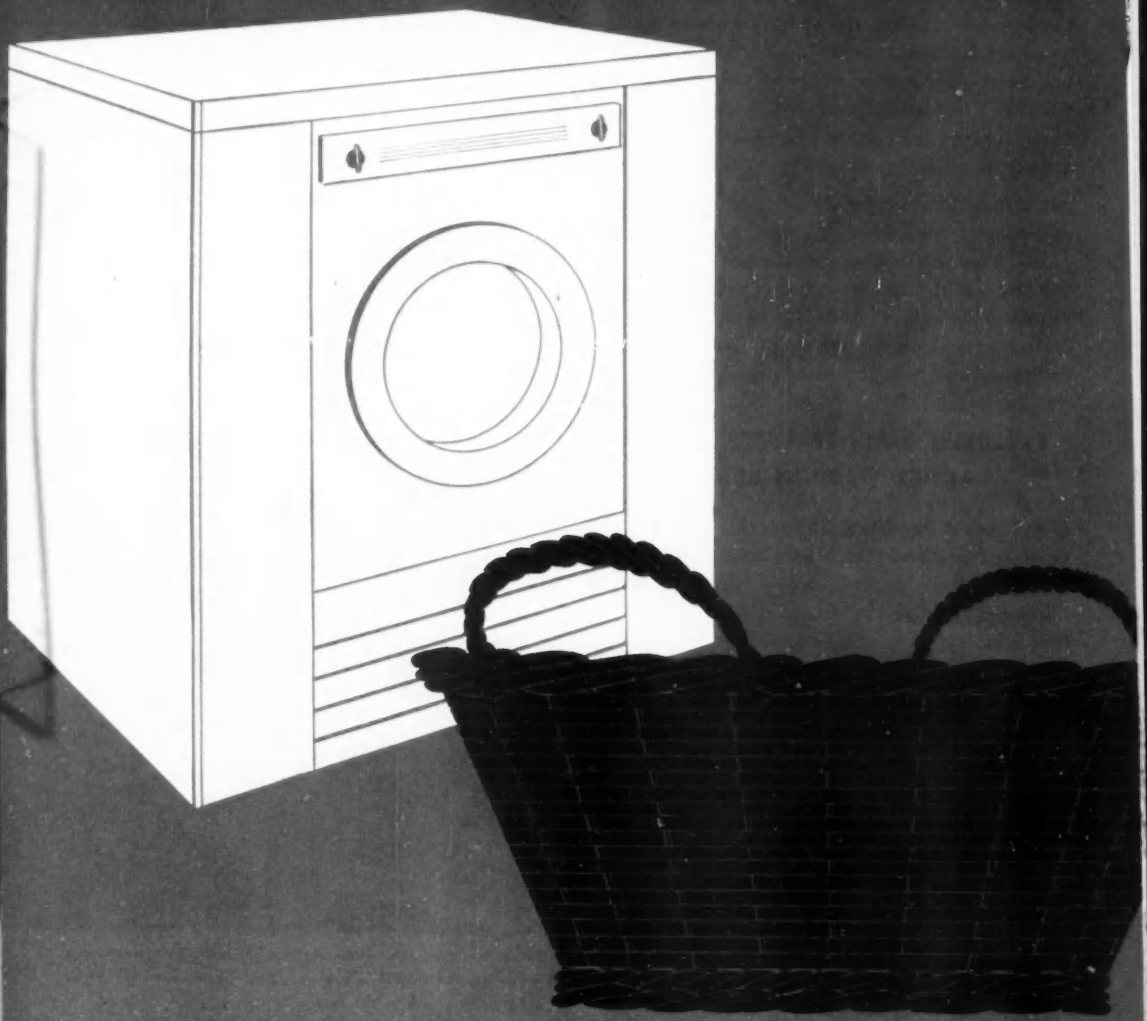
Consult Danly Engineers for the most efficient presses to meet any requirement from 50 tons up. Danly Straight-Side, Single Action, Double Action and Gap Frame Presses are also setting production records throughout industry today.

Write now for catalog on Danly presses which can lead to real cost savings in your press shop.

AND PRESS EQUIPMENT

OVER 25 YEARS OF DEPENDABLE SERVICE TO THE STAMPING INDUSTRY

monday miracle!



To hang out their wash sparkling white and clean, women used to rub endlessly on a washboard, rinse again and again in a washtub. Monday's job really put them through the wringer.

Now they toss the laundry in a machine that washes, rinses, and spin-dries in a matter of moments . . . thanks, in many cases, to a drive mechanism which depends on R/M clutch facings.

A small application, true. But R/M friction materials are doing a *big* job for housewives and for appliance manufacturers . . . just as they are for makers and users of cars, trucks, and draglines. It's not the size of the part that counts; it's the experience and know-how that go into it.

Whatever your product, whatever your problems in design or supply of brake linings and clutch facings . . . you'll find the R/M representative a good man to know. He brings you the experience and the production capacity of four great plants, four research organizations, and four testing laboratories . . . all the facilities of the largest producer in the friction material industry.

RAYBESTOS-MANHATTAN, INC.

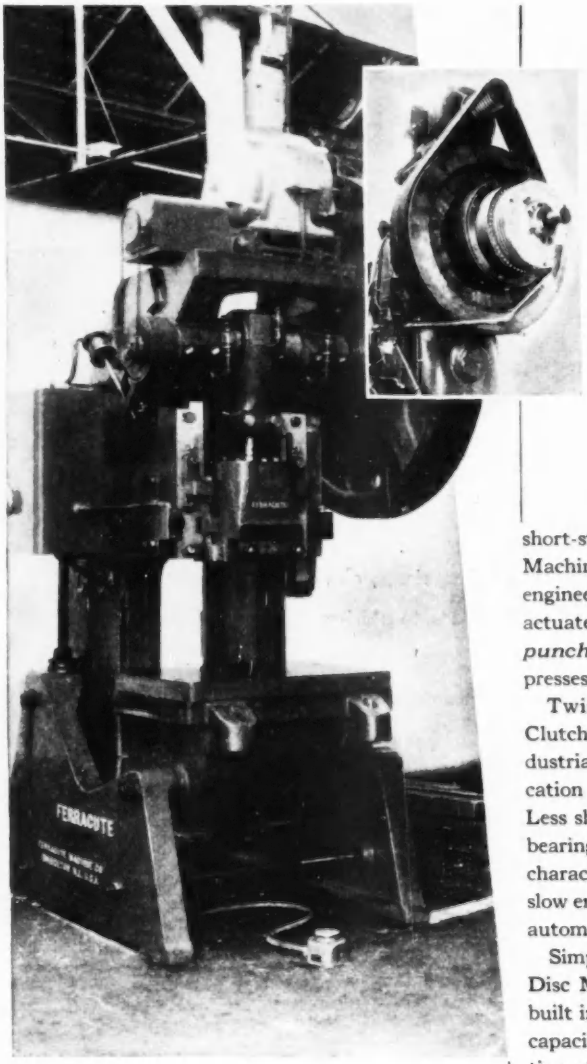
EQUIPMENT SALES DIVISION **620 Fisher Bldg., Detroit 2, Mich.**

445 Lake Shore Drive, Chicago 11, Ill.
4651 Pacific Blvd., Los Angeles 11, Calif.
1071 Union Commerce Bldg., Cleveland 14, Ohio

Factories: Bridgeport, Conn. Manheim, Pa. Passaic, N.J. No. Charleston, S.C.

RAYBESTOS-MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks • Clutch Facings Fan Belts • Radiator Hose • Mechanical Rubber Products • Rubber Covered Equipment • Packings Asbestos Textiles • Powdered Metal Products • Abrasive and Diamond Wheels • Bowling Balls

FIRST IN FRICTION



Ferracute 75-ton Punch Press equipped with Twin Disc Model P Air-actuated Clutch.

Close-up of Model P Clutch installed on Ferracute Punch Press.

100% Faster Punch

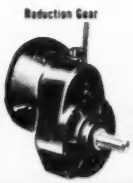
Obtained from Twin Disc Model P Air-actuated Clutch

The problem was how to increase the short-stroke speed on a punch press. The Ferracute Machine Co., Bridgeport, N. J., called in Twin Disc engineers . . . who recommended Twin Disc Air-actuated Clutches. The result . . . *100% faster punch*. Now their complete line of 40 to 110 ton presses uses Twin Disc Air-actuated Clutches.

Twin Disc Models P and PH Air-actuated Clutches—standard on many types of heavy industrial equipment—offer advantages in any application where remote control operation is desired. Less shaft space is needed, permitting closer shaft bearing center distances. They have ideal operating characteristics: high torque capacity . . . fast or slow engagements . . . the ability to absorb heat . . . automatic adjustment for longer wear-life.

Simple in design, rugged in construction, Twin Disc Model P and PH Air-actuated Clutches are built in a wide range of sizes (14 to 42 inches) and capacities (75 to 1325 hp), permitting the selection of exactly the right clutch for every installation. Write for Bulletin 139-B. TWIN DISC CLUTCH COMPANY, Racine, Wisconsin (Hydraulic Division, Rockford, Illinois).

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES



SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

MISTER, YOU MEAN TRU-LAY *PUSH*-PULL

● Here is the best answer to many knotty problems in automotive, aircraft and other machine design. TRU-LAY PUSH-PULL . . .

. . . transmits reciprocal action like a solid rod, yet is flexible as wire rope

. . . will operate over long or short lengths, with few or numerous bends

. . . will operate while flexing

. . . is made in capacities up to 1000 pounds input

. . . is precision-made, assuring minimum backlash and long life

● *This is a descriptive folder about TRU-LAY PUSH-PULL. If you do not have a copy, write our Detroit office. Just ask for* **DH-87.**

ACCO

6-235 General Motors Bldg., Detroit 2 • 1119 Santa Fe Avenue, Los Angeles 21 • Bridgeport, Conn.

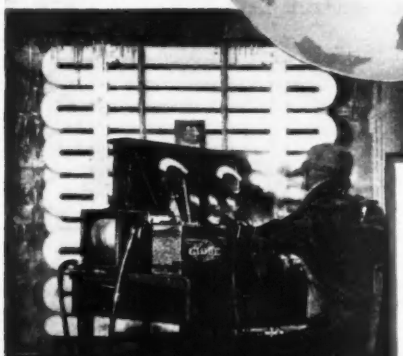
AUTOMOTIVE AND AIRCRAFT DIVISION
AMERICAN CHAIN & CABLE

TRADE MARK

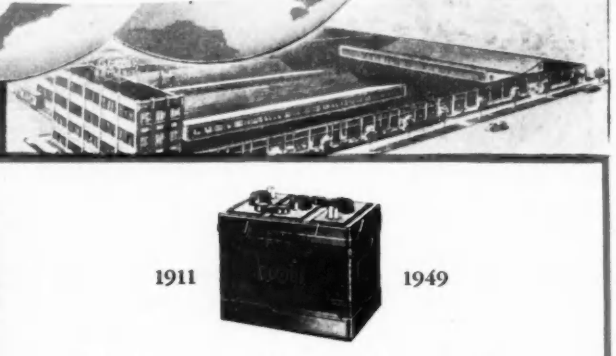
In Business for Your Safety

SPINNING POWER

GLOBE-UNION



HOT OR COLD!
Weather-proof performance assured by
55 INSPECTIONS



A Great Name is Built only with Great Care

A BATTERY is an apparently simple thing to make. There's nothing much to it. Just a box with some lead plates and an acid solution! But it took 38 years to develop the Globe-Union battery of today . . . endless experimentation, search for new methods and materials, invention of new processes, design of new equipment, organization of large scale production. It took infinite insistence on perfection at every step along the way, plus ceaseless vigilance in manufacture.

Significant of the care with which a Globe-Union battery is built are the *fifty-five* inspections through which every model must pass from raw materials to finished product. That's a lot of inspections . . . a lot of care to give to the construction of a simple box containing some lead plates and an acid solution. But it produced "Spinning Power", the split-second starting performance for which Globe-Union batteries are famed, and the lasting quality on which owners of Globe-Union batteries have learned to depend.

GLOBE-UNION INC.
MILWAUKEE 1, WISCONSIN

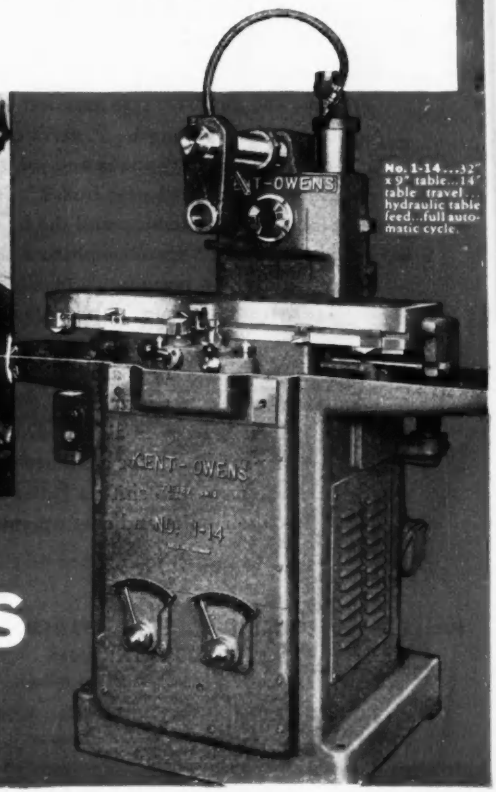
Atlanta, Ga. • Cincinnati, Ohio • Dallas, Texas • Los Angeles, Calif. • Medford, Mass.
Emporia, Kan. • Memphis, Tenn. • Mineral Ridge, Ohio • Oregon City, Ore. • Philadelphia, Pa.

Breeze right through

TOUGH MILLING JOBS WITH KENT-OWENS MILLING MACHINES

Now is the time to "chart your course" to greater production and lower costs . . . with Kent-Owens Milling Machines!

Designed for *top-speed* and *accuracy* where the going is tough . . . ruggedly built . . . efficient . . . dependable. Especially, you'll like the many practical features of Kent-Owens Machines that save job-time and labor. Write for bulletins on the Kent-Owens Standard line . . . including wide range of hydraulic and hand operated machines. Also, let our engineers help you with special machine requirements. Kent-Owens Machine Co., Toledo, Ohio.



No. 1-14 . . . 32" x 9" table . . . 14" table travel . . . hydraulic table feed . . . full automatic cycle.

Call on

KENT-OWENS

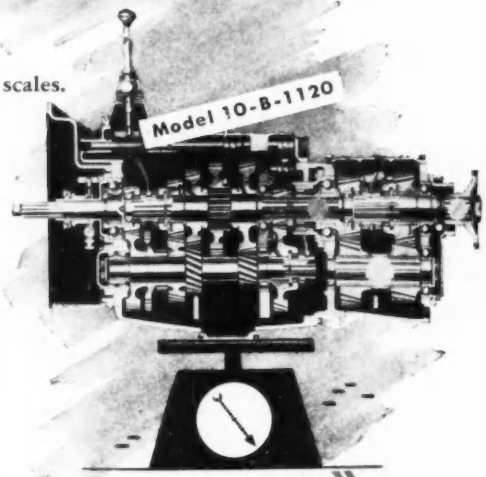
for Milling Machines

for engines up to 1120 cu. in.

It's "shorter on the outside, bigger on the inside," lighter on the scales. For big trucks, on or off the highway, Fuller's 10-A-1120 or 10-B-1120 saves weight over the traditional combination of unit and auxiliary transmission . . . saves installation length . . . saves cost of supplementary shafts and joints. These unit-mounted gear boxes, with all of the overall reduction and the high top speeds of 12 or 15 speed combinations, weigh only 936 pounds . . . install in just over 43 inches . . . provide ten usable ratios.

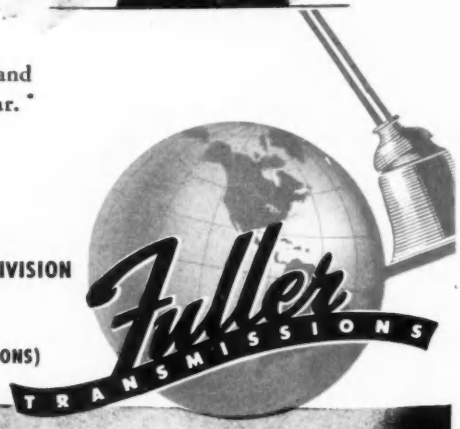
Fuller's heavy-duty units are built with oversize ball and roller bearings . . . helical gearing in all forward speeds and full-floating mounting for auxiliary drive gear.

Ask the man who shifts a Fuller about their quiet and easy operation.

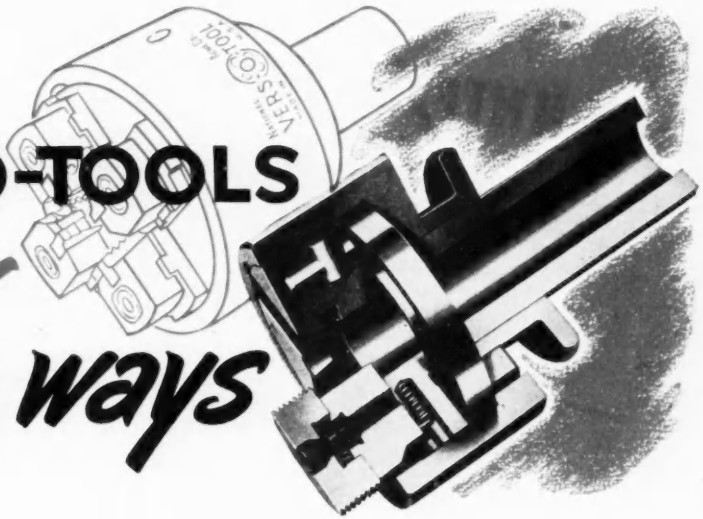


FULLER MANUFACTURING COMPANY, TRANSMISSION DIVISION
KALAMAZOO 13F, MICHIGAN
Unit Drop Forge Division, Milwaukee 1, Wisconsin

WESTERN DISTRICT OFFICE (SALES & SERVICE—BOTH DIVISIONS)
1060 East 11th Street, Oakland 6, California



VERS-O-TOOLS save 6 ways



1 2 3 4 5 6

SAVE ON PARTS—The Vers-O-Tool is the simplest die head made—only 3 main parts: body, hood and adjusting plate. Body is integral with shank; prevents wear looseness, maintains alignment. Fewer small parts to wear or replace.

SAVE ON SPACE AND WEIGHT—The Vers-O-Tool has the smallest O.D. in relation to cutting range of any comparable die head. Both revolving and stationary styles are ideally adapted for use where space and weight are a problem.

SAVE ON PRODUCTION REJECTS—The Vers-O-Tool is precision built throughout. All parts are hardened and ground, to close limits. Sustained accuracy on long runs is characteristic—as is long life.

SAVE ON PRODUCTION TIME—The Vers-O-Tool operates simply, dependably at all times. Opening action is quick, yet smooth—no triggers or other auxiliary gadgets to get out of adjustment and slow up the smooth flow of production.

SAVE ON REGRINDS—The Vers-O-Tool vernier adjustment for locating chasers through a serrated bushing provides for grinds as small as .008". Chaser life is longer, too, whether you use the circular type, for long runs, or the adjustable blade type, for shorter runs.

SAVE ON SET-UP TIME—The Vers-O-Tool design is outstanding for quick diametric adjustment. Two screws move all chasers simultaneously; set-up is completed in a mere matter of seconds.

Simplicity of construction saves time and money on every Vers-O-Tool application. Standardization of interchangeable chasers, size for size, permits the use of just one head for all threading and hollow milling in a given diameter range. For long run work you can use circular chasers, regrindable through 270°—for shorter runs, the new, economical adjustable blade chasers, which always present a perfect thread form, up to correct cutting position, after each regrind.

Complete information on the Namco Vers-O-Tool die head—for use with circular chasers and hollow mill cutters, or adjustable blade chasers and hollow mill cutters is contained in Catalog D-48. Ask for your copy.

24-hour deliveries on standard stockable NF and NC chasers and blocks.

The NATIONAL ACME CO.

170 EAST 131st STREET • CLEVELAND 8, OHIO

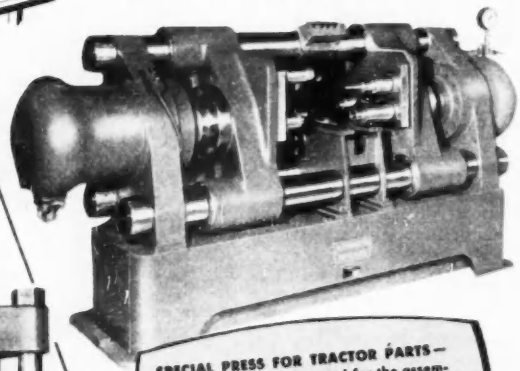
Acme-Gridley 4-6 and 8 Spindle Bar and Chucking Automatics • Single Spindle Automatics • Hydraulic Thread Rolling Machines • Automatic Threading Dies and Taps • The Chronolog • Limit, Motor Starter and Control Station Switches • Solenoids Centrifuges • Contract Manufacturing

HANNIFIN *Engineered*

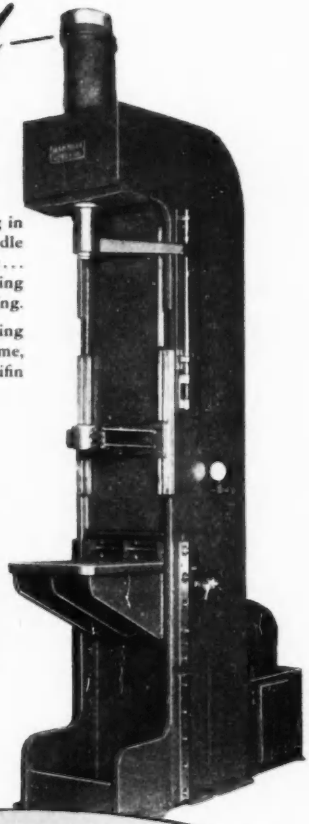
TO SOLVE SPECIAL PROBLEMS!

Here are typical examples of the work Hannifin is doing in building automatic and semi-automatic hydraulic presses to handle standard and special production jobs: press fit assembling... shaping...straightening...forcing...molding...riveting...testing ...loading...gear quenching...broaching...forming.

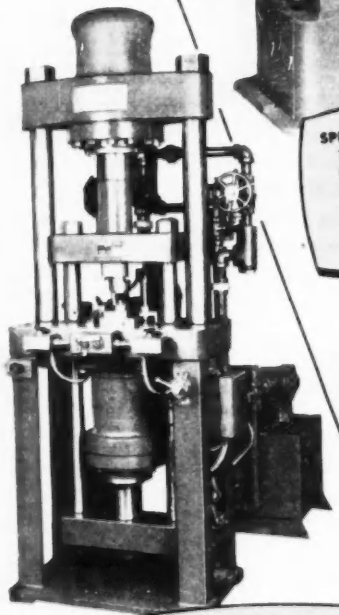
Hannifin offers an expert engineering service in designing and producing presses that can help you cut costs, save time, and do a better job. For recommendations, call in Hannifin engineers or submit specifications.



SPECIAL PRESS FOR TRACTOR PARTS—100-ton duplex press used for the assembly of track link pins for maker of crawler type tractors. Links are fed through and indexed. Left hand press ram advances, followed by right hand ram. Entire cycle is automatic.

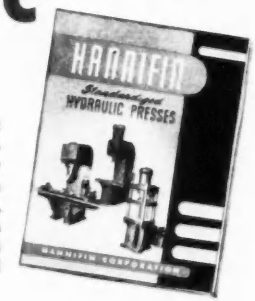


SPECIAL PRESS FOR TESTING AIRPLANE STRUTS—20-ton open gap Hannifin hydraulic press with table adjustable for height. Reciprocation of ram is automatic up to a rate of 20 cycles per minute. Accommodates struts up to 136" in length for testing.



SPECIAL PRESS FOR ELECTRIC MOTOR COMMUTATORS—30-ton press with 20-ton clamp cylinder below table. The lower cylinder clamps the work and the upper cylinder follows down and performs riveting operation. Reverses automatically when riveting is accomplished.

HYDRAULIC PRESSES



THE HANNIFIN line includes a total of 75 different standard models in sizes up to 150 tons. Hannifin design readily permits modifications or variations from standard at moderate cost. Table size, gap, reach, control equipment, and ram speed can be altered easily to suit special conditions. For detailed information, send for a copy of 20-page Bulletin No. 130.

HANNIFIN CORPORATION

1143 S. Kilbourn Ave. Chicago 24, Illinois

AIR CYLINDERS • HYDRAULIC CYLINDERS • HYDRAULIC PRESSES
PNEUMATIC PRESSES • HYDRAULIC RIVETERS • AIR CONTROL VALVES

Nationwide Sales and Service

every handling job is easier with TOWMOTOR MH!

FINGER-TIP HYDRAULIC CONTROL
another Towmotor efficiency feature!

Hydraulic lifting and tilting controls, plus steering column gear shift . . . all in easy reach for precision placement of heaviest loads!

TOWMOTOR precision controls enable one man to handle and place all loads swiftly and accurately. In loading, unloading or stacking right up to the ceiling, TOWMOTOR **M**ass **H**andling simplifies difficult handling jobs, with all controls engineered for the operator's convenience. Compare the Efficiency Features of TOWMOTOR with any other lift truck. You'll see why TOWMOTOR makes every handling job easier, faster, safer. Write for current issue of Handling Materials Illustrated. TOWMOTOR CORPORATION, Division 45, 1226 East 152nd Street, Cleveland 10, Ohio. Representatives in all Principal Cities in U. S. and Canada.

TOWMOTOR
THE ONE-MAN-GANG

FORK LIFT TRUCKS and TRACTORS

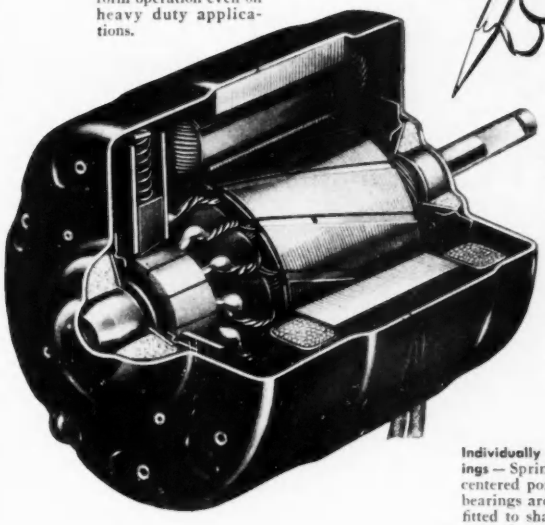
RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

Take time to look...

...INSIDE

High torque—Unusually high torque assures faster starts and uniform operation even on heavy duty applications.

Modulated magnetic field—Vibration is minimized and bearing life lengthened by scientifically chamfering the leading edges of the field poles.



Controlled end play—Quiet, smooth operation is assured by individual adjustment of end thrust.

Cushion-mounted armatures—The carefully balanced rotating mechanism is spring-mounted for long life and quiet operation.

Large pre-seated brushes—Extra large high current capacity brushes are pre-seated for quiet operation.

Armature windings—Tightly wound, carefully insulated, enamel-coated windings are securely wedged in position.

Individually fitted bearings—Spring-tension-centered porous bronze bearings are separately fitted to shaft to tolerance of .0001" at clearance of .0005".

Redmond MICROMOTORS

There's a lot of difference in today's electric motors.

Outwardly, they all conform pretty much to a general pattern for each particular type, size and purpose.

But the experienced buyer of motors knows that the *real character*—the *genuine worth*—of a motor lies beneath the outer shell.

That's why Redmond advises, "Take Time to Look Inside."

For Redmond Micromotors look better, the more they are examined, the more they are compared. Look inside a Redmond Micromotor and you will find a list of features unmatched by any other make.

Look inside and you will learn why Redmond Micromotors give you the smoothest, quietest, longest-lasting service you've ever known in an electric motor.

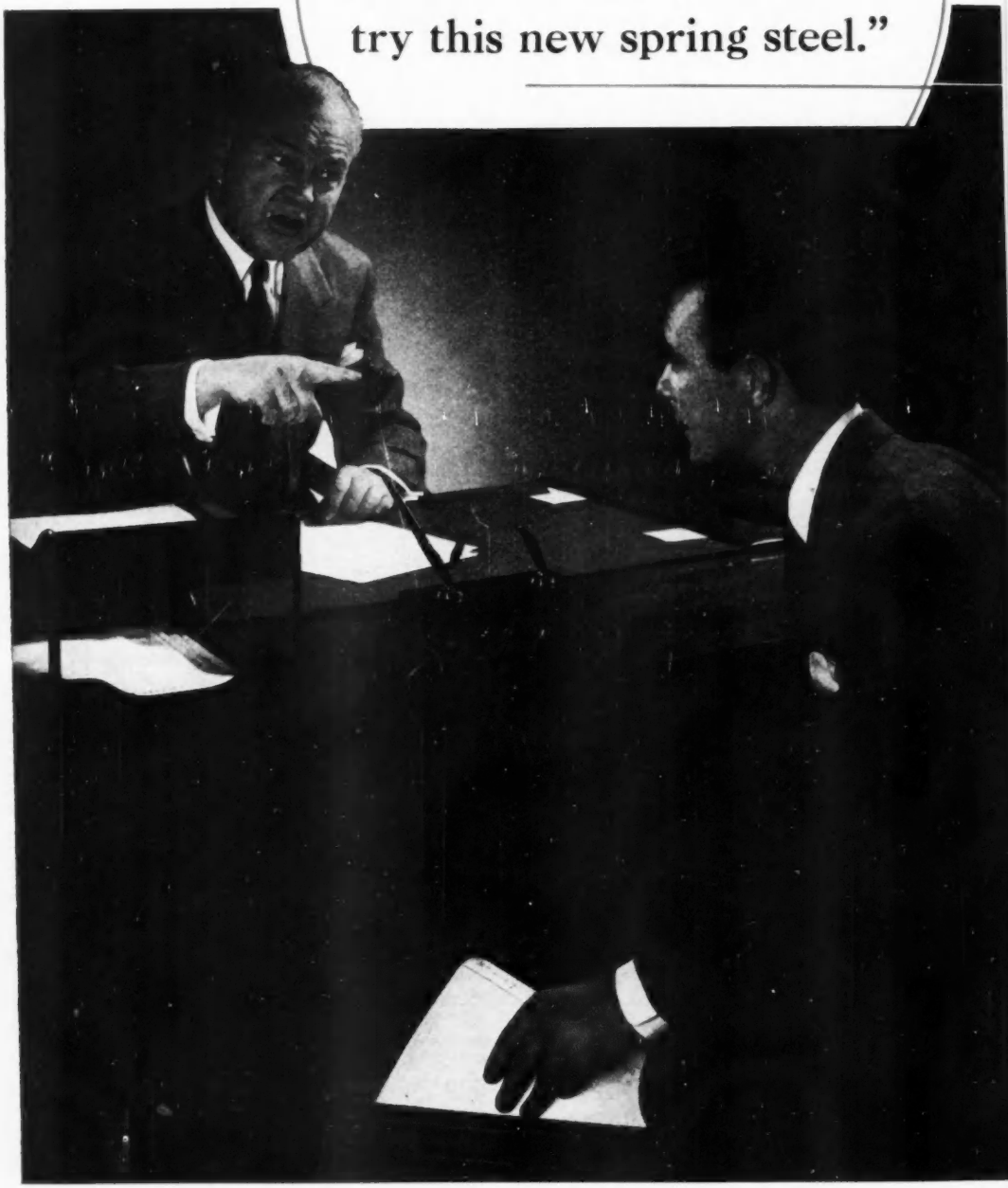
Yes, take time to Look Inside. You'll *see* the difference!

REDMOND

150 standard models, 25 types, up to 1/10th h.p. D.C. and A.C. Illustrated is the type "J" D.C. Micromotor.

Redmond COMPANY, INC., OWOSSO, MICHIGAN

"All right," *he said,* "give me one good reason why I should try this new spring steel."



so we gave him three!

"First," we told him, "this steel we've developed is lower in cost—in fact will cost you about $7.00 a ton less. Second, it has a better, smoother surface than the steel you're now using, which means that you'll lessen the danger of failure. And, third, with this steel there is less decarburization during heating and you'll get better strength in your springs."

That conversation took place less than a year ago. Since then this company, one of the largest makers of lower-priced cars in America, has used this steel for passenger car and truck springs...and has effected savings in steel cost alone that will run well in excess of $100,000 annually.

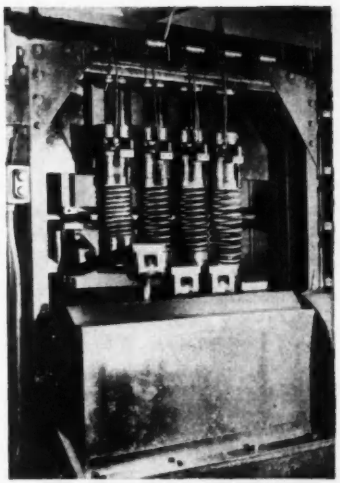
To these savings have been added others equally important. Re-treatment to meet load rates has been reduced from 40% to as low as 2%. Rejects dropped 50%, the inspection crew has been reduced by half.

That these substantial economies are obtained at no sacrifice in spring quality is shown by the fact that in fatigue tests—far more severe than those encountered under normal road conditions—absolutely no spring failures were recorded. Actual service on the road has corroborated these findings and indicates that the better surface and lower decarburization, characteristic of this steel, definitely improve spring performance.

The development of this new spring steel, now officially designated as SAE-AISI 5160, is typical of the constant striving of our metallurgical, research, and operating departments to give you, the steel user, steels *better* suited to your purpose—steels that will improve performance and lower your material and manufacturing costs.

Among such special purpose steels are heavy-duty gear steels like U·S·S Super-Kore; superior-strength plate steels like U·S·S Copper-Nickel-Molybdenum; Hadfield Manganese; and Elevated Temperature steels.

That's why we say—if your job demands the unusual in strength, abrasion resistance, durability, stamina, weldability, or forming qualities—put it up to Carilloy Research.



FATIGUE TEST—Here passenger car coil springs, produced from SAE-AISI 5160, a new precision-rolled spring steel, are being run 500 hours, sufficiently overloaded to stimulate life test on passenger car. No failure yet recorded.

CARNEGIE-ILLINOIS STEEL CORPORATION, PITTSBURGH & CHICAGO
COLUMBIA STEEL COMPANY, SAN FRANCISCO
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM
UNITED STATES STEEL SUPPLY COMPANY, WAREHOUSE DISTRIBUTORS, COAST-TO-COAST
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Carilloy Steels

ELECTRIC FURNACE OR OPEN HEARTH

COMPLETE PRODUCTION FACILITIES IN CHICAGO AND PITTSBURGH

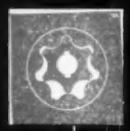
USS

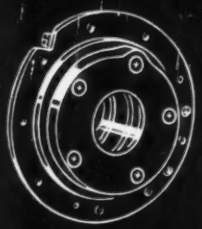
9-752

UNITED STATES STEEL

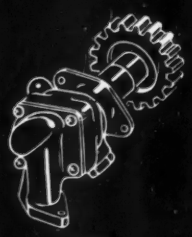
EATON ROTOR PUMPS

for Hydraulic Transmissions Provide Silent Operation, High Efficiency



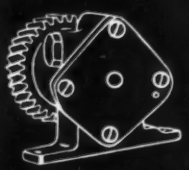


FRONT—
AROUND-THE-SHAFT



REAR—
GEAR DRIVEN

For hydraulic transmission applications, Eaton Rotor Pumps offer the important advantages of silent operation and high efficiency through the operating range. Other uses include engine lubrication, fuel transfer, hydraulic steering, torque convertor supply and implement actuation. Eaton Rotor Pumps are individually designed to deliver a specified result in each application.



FRONT—
GEAR DRIVEN

REAR—
AROUND-THE-SHAFT

EATON MANUFACTURING COMPANY

GENERAL OFFICES: CLEVELAND, OHIO

Pump Division

9771 FRENCH ROAD • DETROIT 13, MICHIGAN

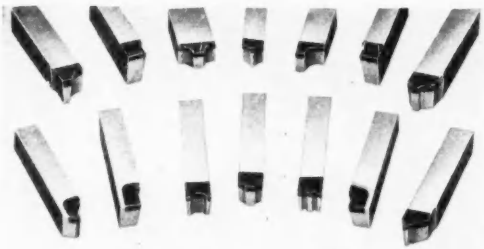
How "Triple C" Plan Helps Federal-Mogul Beat The Trend Towards High Break-Even Point

J. L. Wood, Plant Manager of the Detroit Branch, Federal-Mogul Corporation, manufacturers of bearings noted for exceptional precision and quality, says: "A Coordinated Carbide Control program is important to the maintenance of an advantageous position in a highly competitive field."

A PIONEER in various forms of efficiency in quality production, Federal-Mogul is one of many large companies who are using Carboloy's "Triple C" plan of coordinated carbide control to help beat the trend towards high break-even points caused by rising costs.

Essentially, the plan is one of coordination of *all phases* of carbide use within a plant, under the direct supervision of a *carbide supervisor.*

Under the "Triple C" plan, design, application, and maintenance of carbide tools are standardized wherever possible; grinding, purchasing, inventory control, and handling are coordinated by a carbide coordinator.



Under "Triple C", Federal-Mogul has developed 3500 form tools. Of these 80% are ground from six inexpensive standard Carboloy single-point tools and one standard blank! The seven standards are shown below; above are a few of the form tools developed from them.

Here are a few of the benefits reported by Federal-Mogul:

Advantages of central responsibility:

- Greater utilization of carbide tools
- Organized training of personnel in carbide methods
- Immediate, expert assistance with carbide problems
- Constant inspection of carbide tools by carbide specialists
- Recognition of causes of poor performance or carbide breakage

Advantages of central stock:

- Drastically reduced carbide tool inventory
- Extensive standardization of carbide tools
- More efficient salvage and re-use of worn or broken tools
- Greater economies in special tools

Advantages of central grinding:

- Less grinding equipment needed
- Lower inventory of expensive grinding wheels
- **Expert, specialized grinding of *all* carbide tools**
- Longer carbide tool life
- Elimination of grinding by machine operators
- Less idle machine time

These benefits are *typical.* Wherever the plan has been adopted, similar savings in time and costs have been achieved . . . plus, of course, the amazing increases in production that extensive use of carbides brings to any manufacturing operation! The odds are ten to one that the plan can do as much for your company.

CARBOLOY COMPANY, INC.
11151 E. 8 Mile Road, Detroit 32, Michigan

CARBOLOY®
CEMENTED CARBIDE

COORDINATED CARBIDE CONTROL
THE CARBOLOY "TRIPLE C" PLAN
FOR EVEN GREATER SAVINGS WITH CARBIDES

"bumper" production at Houdaille-Hershey

WITH CLEVELANDS

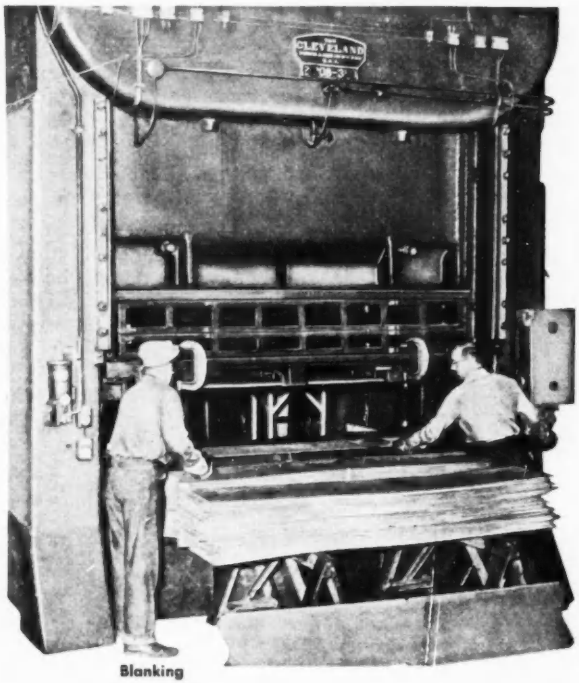
When the Huntington Division of The Houdaille-Hershey Corporation set up their high output production schedule for automobile bumpers, Modern Cleveland Presses were selected for the job.

The four principal bumper stamping operations are shown in the accompanying sequence photographs. Houdaille-Hershey's battery of Modern Cleveland Presses consists of Two-Point and Four-Point models.

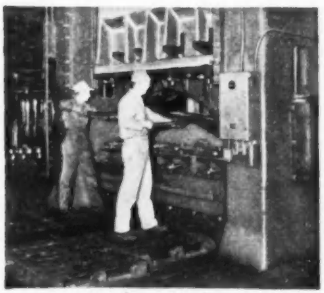
Cleveland's rugged construction is your assurance of longer die life . . . less downtime . . . increased production . . . more economical operation. Every type of Cleveland Press offers you these same operating advantages. Included in the Cleveland line are: Inclinable, Horning, Punch Type, Gap Type, Straight Sided, Trimming, Knuckle Joint, Double Action Toggle and Single Point.

For complete information on these or other types of Modern Cleveland Presses, write for a copy of our folder 75 today.

A 2264

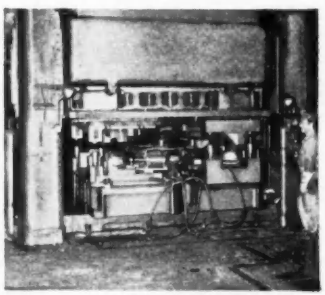


Blanking



Hot form—1st draw

Hot form—Parting



Trimming

THE CLEVELAND PUNCH & SHEAR WORKS CO. U.S.A.

Established 1880

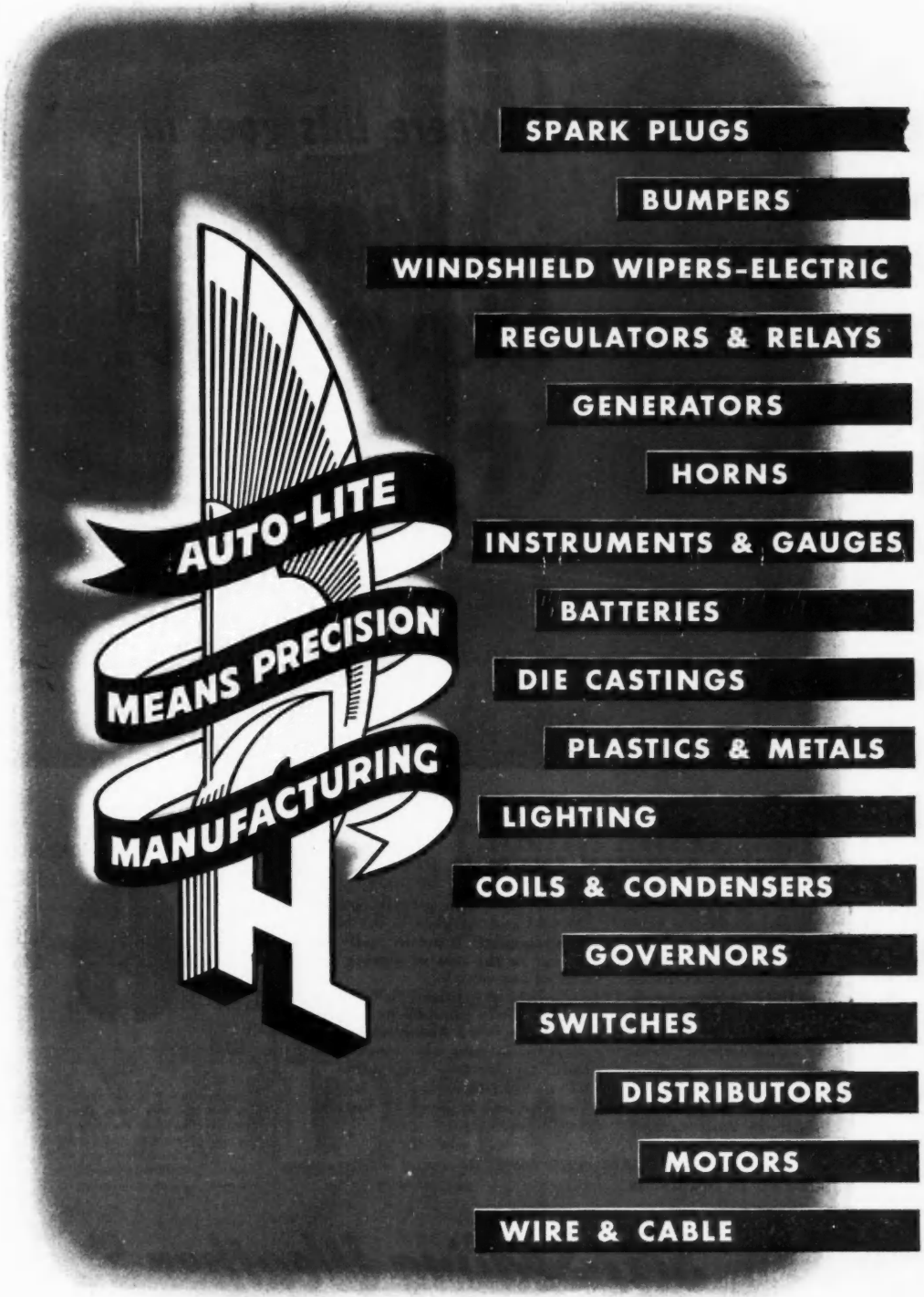
PUNCHING TOOLS & DIES

OFFICES AT:
NEW YORK.... CHICAGO
DETROIT.... PHILADELPHIA
PITTSBURGH

FABRICATING TOOLS

CLEVELAND 14, OHIO

• • • • • • POWER PRESSES • • • • • •

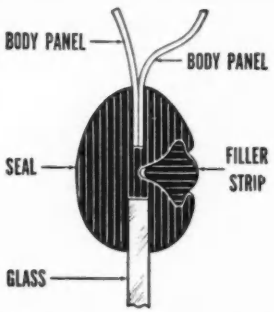

AUTO-LITE
MEANS PRECISION
MANUFACTURING
SPARK PLUGS
BUMPERS
WINDSHIELD WIPERS-ELECTRIC
REGULATORS & RELAYS
GENERATORS
HORNS
INSTRUMENTS & GAUGES
BATTERIES
DIE CASTINGS
PLASTICS & METALS
LIGHTING
COILS & CONDENSERS
GOVERNORS
SWITCHES
DISTRIBUTORS
MOTORS
WIRE & CABLE

Inland Self-Sealing Weather Strip means lower cost to maker, permanent service to user

Ordinary methods of sealing windshields, windows, doors and lamp assemblies mean *high production costs* to the maker of trucks, buses, cabs and other commercial vehicles. Two men on the job, preparation, subassembly, slow installation, reworking and cleanup . . . these pyramid as manufacturing items.

Inland Self-Sealing Weather Strip slashes such costs. Installation is an easy, fast, one-man (or woman) job. Every motion, every minute, goes into actually setting the seal and the glass in the body-panel opening. It means really big savings in the cost of glazing and sealing any vehicle.

And because Inland Self-Sealing Weather Strip provides permanent protection, it's a strong sales argument to the user who wants long-lived, trouble-free satisfaction in service. Write today for Inland specifications to meet all installation needs.



See how easy it is? The seal goes readily onto the body panel. Then the glass fits into the seal. Then the filler strip is zipped into the locking channel. That window or windshield, and all the rest of them, are weatherproofed for keeps. Simple, easy, fast, economical.

INLAND MANUFACTURING DIVISION
GENERAL MOTORS CORPORATION DAYTON, OHIO

INLAND MANUFACTURING

Self-Sealing Weather Strip (PATENTED)

Introducing

MIDLAND'S *New* POSITIVE SAFETY LOCK TYPE SLACK ADJUSTERS

NOW MIDLAND *Provides:*

- ✓ A slack adjuster that *positively* will not back off in service.
- ✓ An internal lock that registers a definite "click" when adjusting.
- ✓ An external positive spring steel lock. (see illustration at left) External lock is weather proofed spring steel.
- ✓ Neither corrosion, excessive lubrication or weather conditions will affect the adjustment.

See MIDLAND for:

STANDARD SLACK ADJUSTERS
HEAVY DUTY SLACK ADJUSTERS
OFF-SET ARM SLACK ADJUSTERS
DOUBLE-END SLACK ADJUSTERS

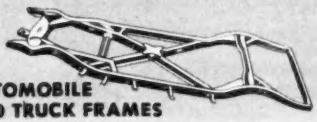
New! Midland's positive lock-type slack adjuster for all air and vacuum equipped trucks, tractors, trailers and buses.

THE MIDLAND STEEL PRODUCTS CO. • 6660 MT. ELLIOTT AVE., DETROIT 11, MICH.

Export Department: 38 Pearl Street, New York, N. Y.

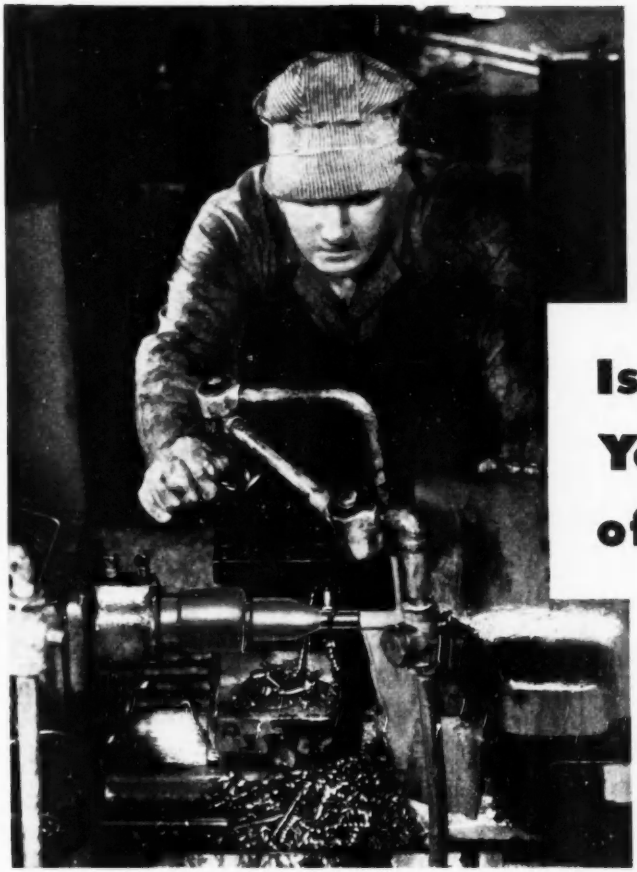
MIDLAND

POWER BRAKES



AUTOMOBILE AND TRUCK FRAMES

BUS DOOR CONTROLS



Is Machining Your Method of Inspection?

If you depend on machining to locate hidden defects in parts or material, you pay an exhorbitant price for "inspection"— through wasted labor and machine time. Further, there may be defects "getting by" that can later cost someone plenty in trouble and dollars.

Machining defective materials is a dead loss! Inspection with *Magnaflux is the modern, economical way that locates defects *before* machining. It is fast, non-destructive and *accurate*. If there is a defect Magnaflux locates it — positively, clearly and unmistakably, whether it is a surface or subsurface crack, a forging lap, a tear, or what have you? Inspection on an engineered Magnaflux unit proves cheaper than even visual inspection, as well as more effective.

Magnaflux inspection is a proved way to turn wasteful losses into profitable operations. That is mighty important to you today. Take just a minute or two right now to write for full particulars.

*Magnaflux, trademark of Magnaflux Corporation applied to equipment and materials for use with magnetic particle inspection.

MAGNAFLUX CORPORATION

5904 Northwest Highway, Chicago 31, Illinois

NEW YORK • DALLAS • DETROIT • CLEVELAND • LOS ANGELES

Export Distributor: Curtis Wright Corp. *In Canada:* Williams & Wilson, Ltd.

You can depend on premium performance from any product that bears the name

AMERICAN BOSCH

Winner in every field

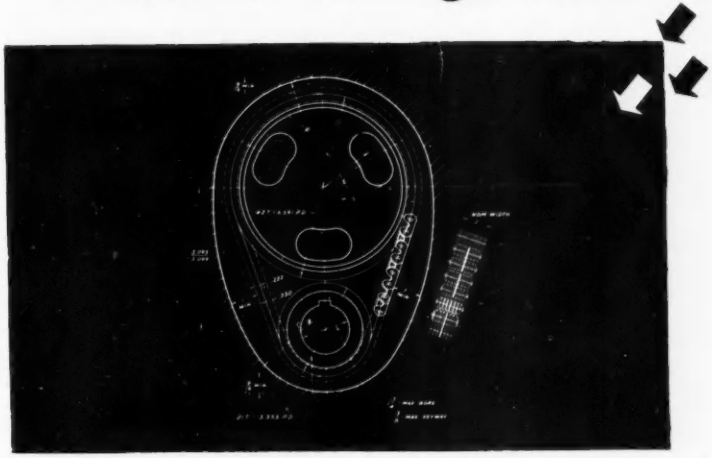
When the green flag is down and the going's tough — that's when American Bosch *super-powered* magnetos really shine. For years, American Bosch has been building magnetos that have what it takes to make a winner — on the race track . . . in the air . . . and under the roughest farm and industrial use. It's that wealth of experience that gives American Bosch magnetos their rugged dependability, ace-high performance, and ability to deliver long years of trouble-free service. Next time you need a magneto, make it an American Bosch . . . you couldn't buy a finer magneto.

STAR OF THE INDIANAPOLIS CLASSIC

Again in '49, American Bosch magnetos proved their metal in the gruelling Memorial Day Classic. Of the first ten; — 2nd, 5th, 6th, 7th and 10th places went to cars equipped with American Bosch's latest type MJL Magneto, while the 1st, 3rd and 4th places went to cars equipped with pre-War Bosch models. The same know-how and production skill that builds these star performers of the race track are yours when you buy an American Bosch magneto for your farm or industrial engines.

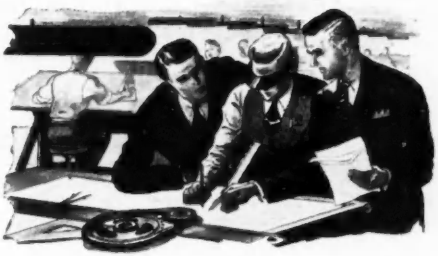
AB AMERICAN BOSCH CORPORATION • SPRINGFIELD 7, MASSACHUSETTS

What's most important about a timing chain drive?



1. Morse timing chain drives, such as the one shown in this drawing, have been operating silently and efficiently under more automobile hoods than any other type of timing drive. That speaks worlds for the quality of Morse Silent Chain and Sprockets, but there's another side of the story.

Is it possible that it would pay you well to turn a critical eye to your current chain drives? Are you taking advantage of the latest developments in chain and sprockets? Can already good performance be stepped up? Can substantial savings be made in manufacturing?



2. Here are just a few of the factors to investigate with Morse engineers; sprocket-tooth combination in relation to chain life; guide position and type; lubrication methods; chain width; placement of sprocket reliefs; sprocket materials. All these points — and many more — are carefully weighed by Morse in developing or improving a drive.

3. Every element in a chain drive is of equal importance in attaining maximum performance. Have Morse review your *complete* timing-drive situation. As automotive chain specialists, Morse can evaluate all factors. Volume production in two plants, means your requirements get full attention. Contact Dept. 395 Morse Chain Company, Detroit 8, Michigan.

Roller Chain Drives

Roller Chain Couplings

Silent Chain Drives

MORSE

MECHANICAL

POWER TRANSMISSION

PRODUCTS

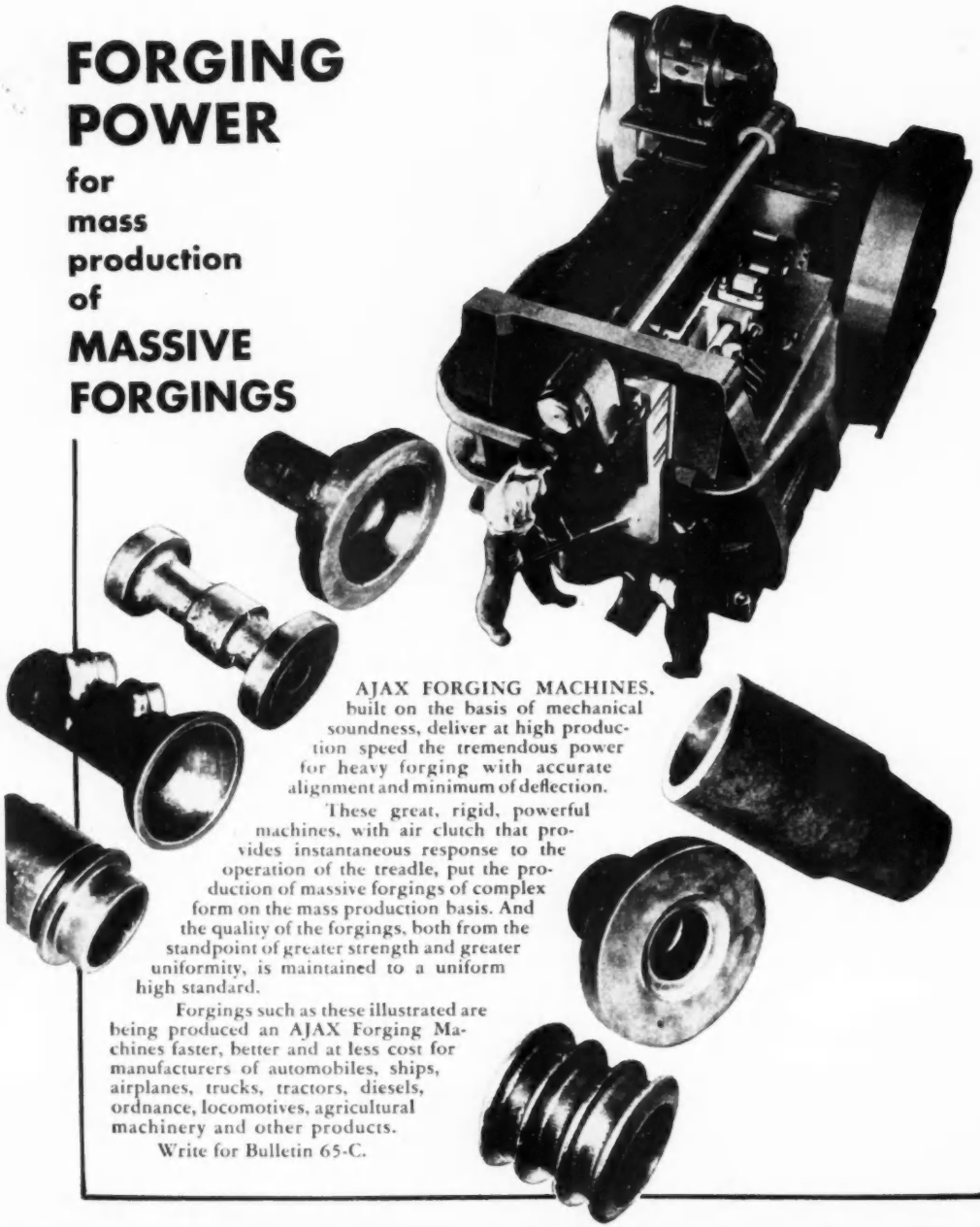
A PRODUCT OF B-W BORG-WARNER

Free Wheeling Clutches

FORGING POWER

for mass production of

MASSIVE FORGINGS



AJAX FORGING MACHINES, built on the basis of mechanical soundness, deliver at high production speed the tremendous power for heavy forging with accurate alignment and minimum of deflection.

These great, rigid, powerful machines, with air clutch that provides instantaneous response to the operation of the treadle, put the production of massive forgings of complex form on the mass production basis. And the quality of the forgings, both from the standpoint of greater strength and greater uniformity, is maintained to a uniform high standard.

Forgings such as these illustrated are being produced an AJAX Forging Machines faster, better and at less cost for manufacturers of automobiles, ships, airplanes, trucks, tractors, diesels, ordnance, locomotives, agricultural machinery and other products.

Write for Bulletin 65-C.

THE Ajax MANUFACTURING COMPANY

EUCLID BRANCH P. O. CLEVELAND 17, OHIO

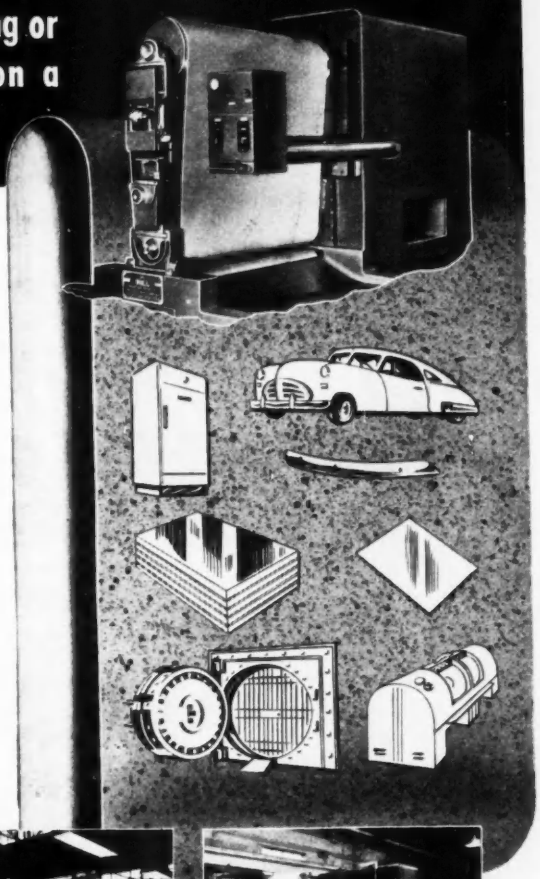
110 S. DEARBORN ST. CHICAGO 3, ILLINOIS

DEWART BUILDING NEW LONDON, CONN.

"HILL" ABRASIVE BELT POLISHER

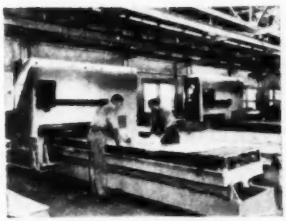
Is The Answer

for pre-finishing, conditioning or salvaging FLAT surfaces on a wide variety of products.

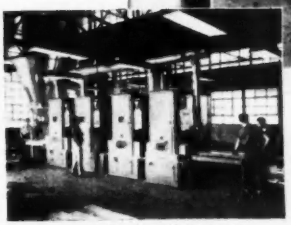


● "HILL" 2-Roll Vertical Abrasive Belt Polishing Machines have improved the finish, established lower cost and increased production of,—Refrigerator Cabinets, Auto Bodies, Auto Bumpers, Press Plates for Plastics, Photo-Engravers Plates, Safe and Bank Vault Doors, also Laundry Machines.

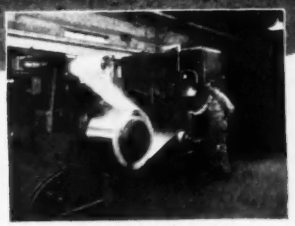
"HILL" Abrasive Belt Polishing Machines feature Massive Construction, Simplicity of Design, Accessibility, Versatility, and Centralized Controls, —with appurtenances necessary to adapt each type of machine for successfully polishing FLAT ferrous and non-ferrous metals over a wide range of sizes and diversified applications.



Hydraulic Table Type for individual sheets or plates.



Power Feed Roll Type in series for line production.

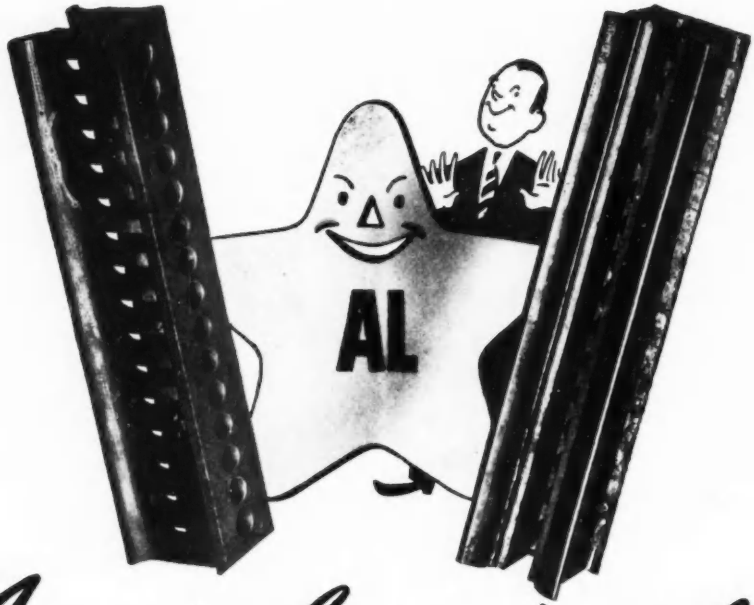


Coiler Type for strip in coil form.

THE HILL ACME COMPANY

6400 BREAKWATER AVENUE • CLEVELAND 2, OHIO

"HILL" GRINDING AND POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING THREADING • TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES



"Amazingly good results"
(SAID THE USER)

from this Gang Milling Fixture made of AIRLOY

There's an A-L Tool Steel to do each job best!

★

The Allegheny Ludlum Tool Steel family includes 37 principal types, covering the high speed, hot work, shock resisting, cold die, and carbon and low alloy steel fields. Let us help you find the best answer to *any* problem that occurs in your production or use of cutting and forming tools.

Address Dept. A-77

Particularly in view of the way it is cut up, the fixture shown above—made of A-L "AIRLOY" (a manganese-chrome-molybdenum air hardening cold die steel)—gave a performance that delighted the user, *and that's what counts!*

The fixture was designed to hold 15 small parts, 1/2" x 3/8", for milling a slot. In heat treatment, each fixture was first preheated at 1150° F., then raised to 1475° F. and held there for 7 to 8 minutes, then air cooled—resulting in a hardness of 62/63 Rockwell C. After a draw at 500° F., the final hardness was 57/58 C. Accurate measurement before and after heat treating revealed that there was *no change in sizes.*

AIRLOY is just one of eight principal types of A-L Cold Die Steels—hardenable from low temperatures, insuring low scale loss and freedom from cracking and distortion. One of these types can help you, and our Technical Staff is always at your service—no obligation.

ALLEGHENY LUDLUM STEEL CORPORATION
Pittsburgh, Pa.

TOOL STEEL DIVISION: DUNKIRK, N. Y.

Fine Tool Steels Since 1854 W&D 1780

DISCOVER
THE SAVINGS
IN *specially designed*
LOCKING POWER

WRITE FOR THIS FREE BOOK!

Investigate the cost-saving and performance-improving advantages of engineered Shakeproof Lock Washers!

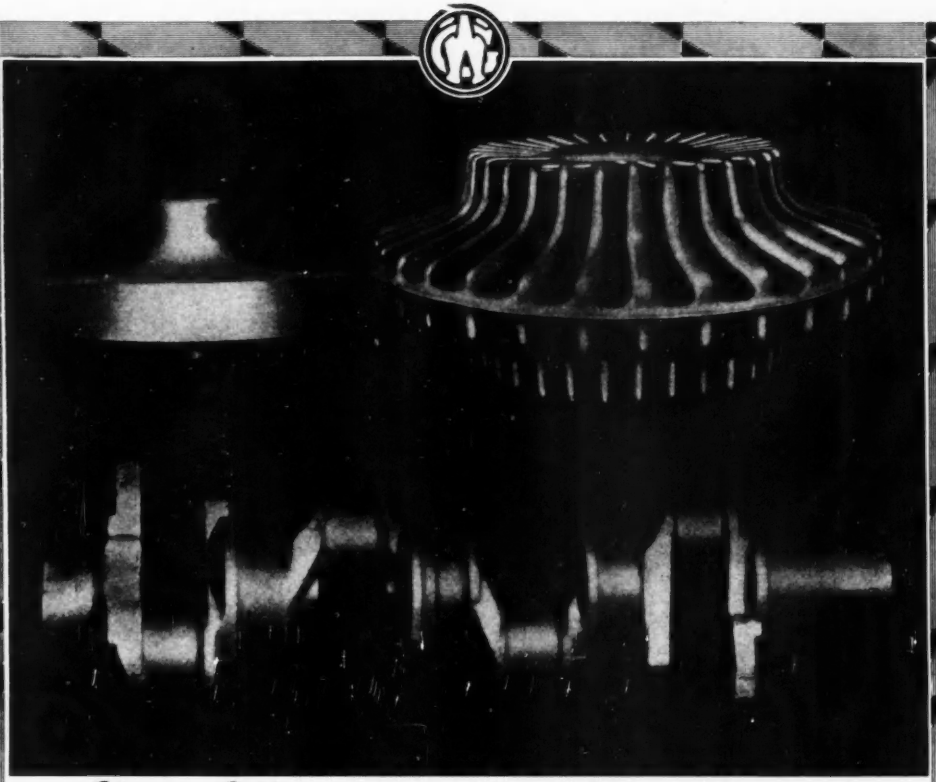
Look-alikes don't always work alike. For example, the Internal Type Shakeproof Lock Washer shown above has a standard rim and standard number of teeth for use under standard ½" nuts. The Internal Lock Washer at left is a special *thin-rimmed* washer with *more* locking teeth for specific use under ½" conduit nuts in electrical assemblies.

Knowing when and how to apply the standard and special types and sizes of Shakeproof Lock Washers will mean increased fastening efficiency and lower assembly costs to you. And, that's what this new book on Shakeproof Lock Washers is for . . . with illustrations and typical applications of all the Shakeproof Lock Washer types, an explanation of the locking principle and handy size data! See what Shakeproof Lock Washers can do in your specific application. Write for your free copy today!

SHAKEPROOF inc., Division of Illinois Tool Works, 2501 North Keeler Avenue, Chicago 39, Illinois. In Canada: Canada Illinois Tools, Ltd., Toronto, Ontario.

FASTENING HEADQUARTERS
TRADE MARK

Shakeproof
LOCK WASHERS



Wyman-Gordon—specialists in the vital forgings of the internal combustion engine since its inception—is today the largest producer of crankshafts for the automotive industry and of all types of forgings for the aircraft industry.

Be it crankshafts and other vital forgings for the piston type engines or turbine wheels and impellers for turbo jets—there is no substitute for Wyman-Gordon experience.

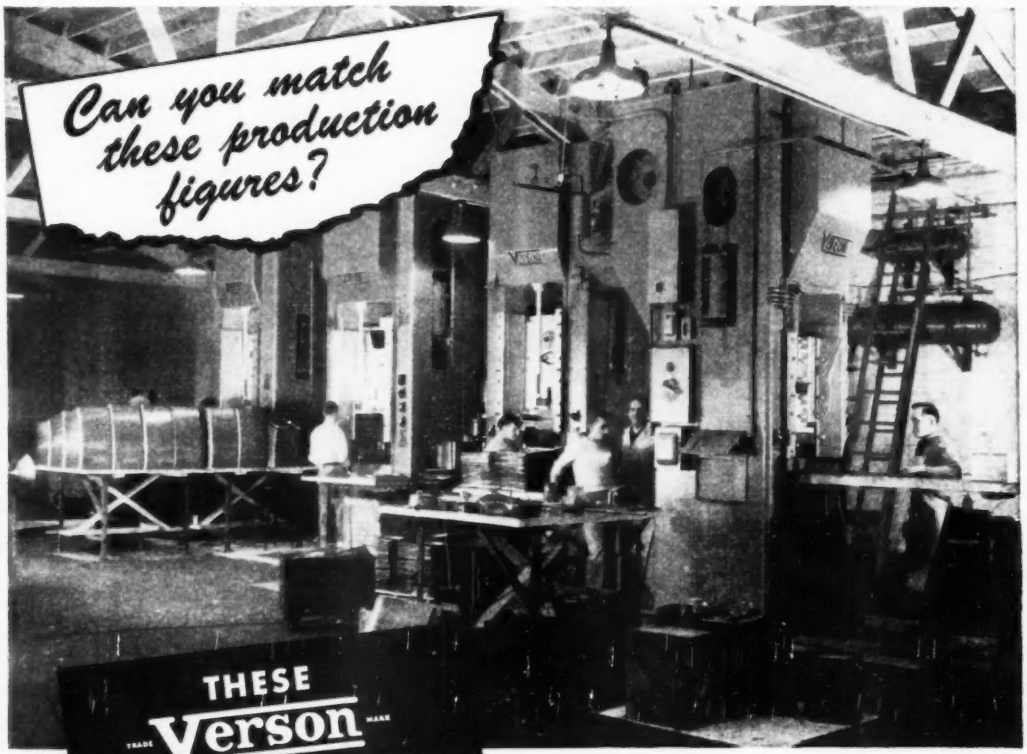
Standard of the Industry for More Than Sixty Years

WYMAN-GORDON

Forgings of Aluminum, Magnesium, Steel

WORCESTER, MASSACHUSETTS, U. S. A.

HARVEY, ILLINOIS - - - DETROIT, MICHIGAN



The group of Verson Full Eccentric Presses illustrated above form a compact production unit that makes full use of Verson's advantages of speed, accuracy and power. Stock is automatically fed into the press at the extreme right where the first cut-off and drawing operation takes place. The pieces move on for trimming and piercing on the second press and forming in the third press. Final piercing is accomplished in the press at the extreme left. While set up for phonograph motor boards in this view, the presses can be changed over quickly for other jobs.

Get full details on how Verson Full Eccentric Presses can speed your production and lower your costs. And ask about such Verson features as: Allsteel Construction, Full Eccentric Action, "Straight Thrust" Eccentric Strap, Positive Action Clutch and Brake and others. Write today.

Stages in production of motor boards

First Operation: Cut-off and drawing | Second Operation: Trim and Pierce | Third Operation: Forming | Fourth Operation: Final Pierce

Originators and Pioneers of Allsteel Welded Stamping Press Construction

VERSON ALLSTEEL PRESS COMPANY

9307 South Kenwood Avenue, Chicago 19, Illinois — Holmes Street and Ledbetter Drive, Dallas 8, Texas

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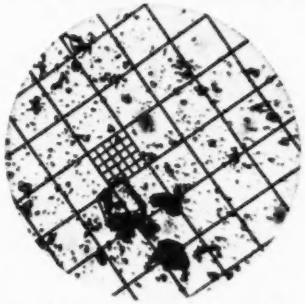
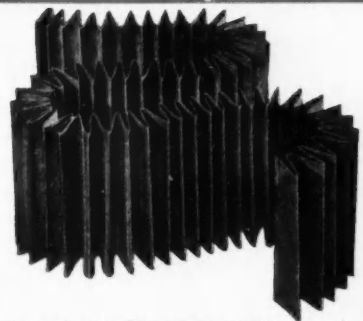


Filters Micronic Particles! In tests made by the Government on oil filters, with approved Test Dust containing graded dust ranging from one micron on up, Purolator filtered 97.8% on the very first pass-through.



5 Times Greater Filtering Area! The accordion-pleated design of the Purolator Micronic Filter provides an area 5 times that of old-style filters. More than 10 feet of filtering surface in a 3⅛ inch diameter element!

4 Big Reasons Why Purolator is the favorite standard equipment oil filter!

Can't Warp, Distort, Disintegrate!—Purolator's Micronic element is made of cellulose specially impregnated with plastic. The immersion test shown above proves water dilution will not affect filter medium or flow rate.

PERCENTAGES BY WHICH PUROLATOR MICRONIC ELEMENT EXCELLED COMPETITIVE TYPES

COMPETITOR	IN AVERAGE DIRT RETENTION PUROLATOR LED BY:
A	199%
B	220%
C	113%
D	547%
E	164%
F	619%
G	255%
H	339%
I	318%
J	193%
K	237%
AVERAGE PUROLATOR SUPERIORITY	290%

Removes 200% More Abrasives! In competitive tests against comparable filters . . . Purolator led in average dirt retention by 290% (as shown above) because Purolator filters particles measured in microns (.000039 of an inch) and has greater filtering area.

To create additional acceptance for your engines and vehicles, equip them with the most efficient oil filter . . . the Purolator Micronic Filter.

Purolator not only protects engines by removing *all* the sludge, *all* the abrasives . . . it also *leaves* in the oil any additives placed there by the refinery for greater lubrication efficiency. Other types of filters often remove these additives.

Write for further information. And be sure to contact Purolator's highly experienced engineering staff about your *special* filtering problem.

PUROLATOR PRODUCTS INC.

Newark 2, New Jersey and Windsor, Ontario, Canada

PUROLATOR

MICRONIC OIL FILTER

"FIRST IN THE FIELD OF FILTERING"

Here's your Man-Size Answer for a Man-Size Job...it's the

HOUDAILLE* HUSKY

The Husky—a new heavy-duty shock absorber—is Houdaille's answer to dependable ride control on the heavier cars or those sold for tougher than normal service in either domestic or export markets.

Its huskier construction and greater fluid capacity mean low-pressure operation for better riding and longer life, plus extra strength and stamina to perform under the hardest possible usage without undue strain or wear. Adoption of the Houdaille Husky entails no engineering changes since it is interchangeable with standard size units without drilling or special brackets and without sacrifice in collapsed or extended length.

We confidently believe that the Houdaille Husky is the finest direct-action shock absorber ever built. Complete information is yours for the asking.

*Say "Hoo-dye"

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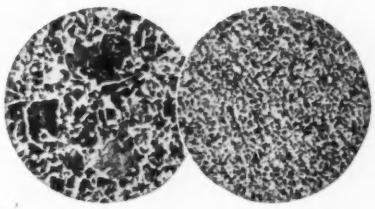
BUFFALO 11, NEW YORK
America's Pioneer Builder of Hydraulic Shock Absorbers

YOU CAN DEPEND ON

VANADIUM

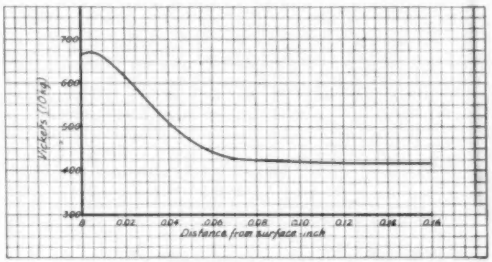
to give you grain size control, high performance, and ease of processing

GRAIN SIZE is refined by the addition of vanadium, the balance between strength and toughness is improved, and greater uniformity is promoted between transverse and longitudinal properties.



0.34 C 0.34 C, 0.20 V

HIGH PERFORMANCE follows the use of vanadium in constructional steels. In carburized parts, for example, the well-integrated bonding between case and core, inherent in vanadium carburizing steels, assures excellent shock-resisting properties and maximum service life.



Hardness penetration graph of Chromium-Vanadium A 6120 steel, with a light case (0.80–0.85% carbon) in outer .010 inch

EASE OF PROCESSING—Uniformity of vanadium steels from heat to heat, with easy and uniform response to thermal and mechanical treatments, brings large compensation—savings far over-shadowing differences in initial materials costs.

Our metallurgists will be glad to assist you in the application of vanadium to meet your requirements.

MAKERS OF FERRO-ALLOYS VANCORAM CHEMICALS AND METALS

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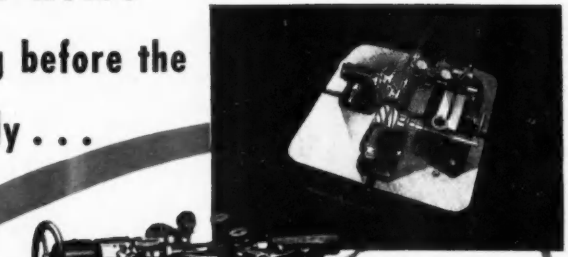
Gear errors and Gear noise

should be discovered long before the gears reach final assembly . . .



There is a profit in scrap for the scrap dealer, but most certainly not for the gear manufacturer who suddenly discovers that an entire lot of gears have to be scrapped because they fail to meet tolerance requirements or because they are too noisy.

If economy is important in your plant, the time to find out about machining errors is right at the machine which causes the trouble—not after all the subsequent operations including heat treatment have been completed and the gears assembled in some power unit.

The best insurance against high cost of scrap gears is the use of gear checking machines right down there in the plant where the gears are being produced and where they can be checked periodically by the machine operators.

The Red Ring Gear Checker quickly reveals any dimensional errors and the Red Ring Gear Sound Tester immediately puts an accusing finger on noisy gears. Both machines have laboratory accuracy, they can be used anywhere in the plant or inspection department and they prevent a great deal of waste.

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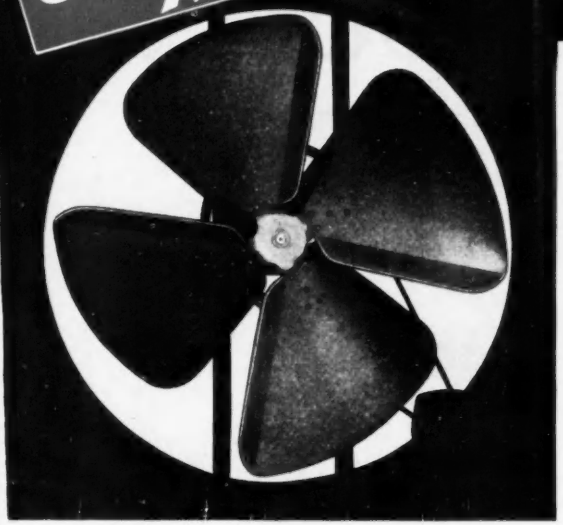
Last Summer's Heat

LAID A HEAVY HAND on PRODUCTION



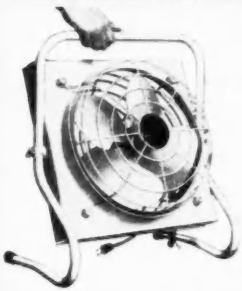
THE LOW COST OF COOLING AND VENTILATING HOT SPOTS IN PLANT OR OFFICES WITH FRESH-AIR MAKERS WILL SURPRISE YOU

You can transform an entire department into a well ventilated good-place-to-work, boost morale and increase output with a few well placed Fresh-Air Maker fans, and they will pay off extra well where women are working.

Fresh-Air Makers are a "natural" for foundries and to take the heat, smoke, fumes and general discomfort away from forging operations, heat treating, annealing, ovens, tanks, or any place where heat is used in processing.

And Fresh-Air Makers will pay big dividends in freshening up plant and administrative offices, canteens, first-aids, reception rooms, lockers, or those places stuck away off, behind or up on balconies and used for cribs, records, or stock, where no one can possibly do his best.

There are twelve sizes of Fresh-Air Makers to handle any job, large or small, up to 20,500 cfm for a single fan, all unusually adaptable to installation conditions. Use them on the floor or at the ceiling, as exhausters in the wall, in lofts, on the roof in monitors or penthouses, or in the ceiling for all Fresh-Air Makers are equipped with fine ball bearings to permit horizontal installation if desired.



Handy, portable models adjustable for any angle—12"—16"—20"—exhaust or adjustable window models also.

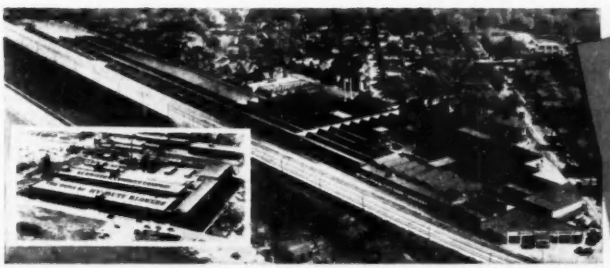
Characteristic Industrial Fresh-Air Maker—a powerful, belt driven fan, all welded construction, with four deep pitched wide blades, accurately balanced, quiet and of exceedingly low power consumption—steel parts all heavy gauge and fan carried on two fine, prelubricated ball bearings.

Non-ferrous Foundry—3-48" Fresh-Air Makers (61500 cfm) in roof.

AIR HANDLING AT ITS QUIETEST BEST!

Comfort by portable Fresh-Air Makers in a machine shop office.

Over main entrance, ventilating reception room.



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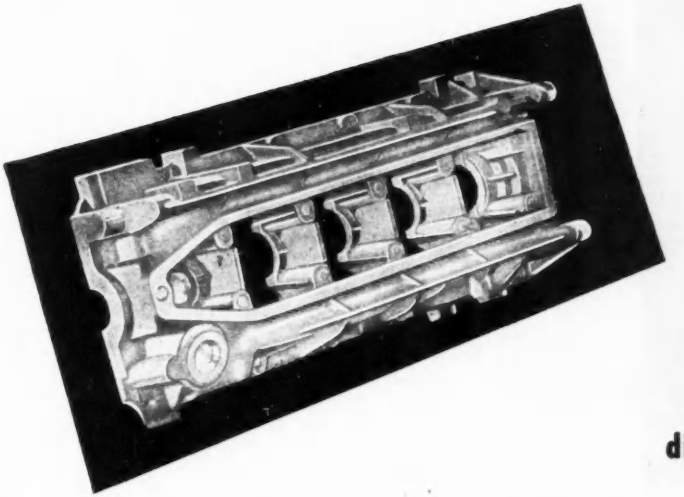

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—plus corrosion resistance and dimensional accuracy

A typical parts problem solved with the help of

Permite Aluminum Engineers

You know the properties you need in your aluminum castings — the precise tensile strength, yield strength, ductility, corrosion resistance, etc. — also your requirements as to cost, quantity, and design.

You can be certain of obtaining castings that meet these requirements when you bring your parts problem to Permite engineers . . . specialists in the aluminum casting field. They can help you select from the great number of modern aluminum alloys available, the one alloy that will assure the results you want.

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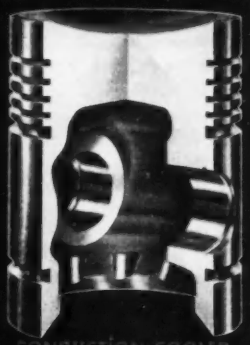

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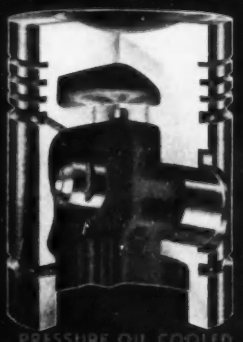

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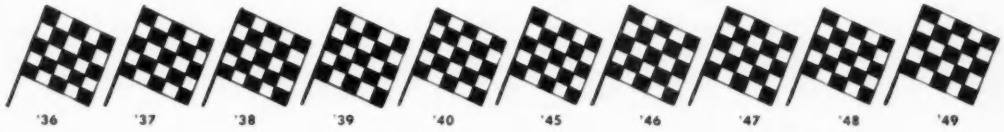

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EVERLOCKS—conquers vibration.
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A real performance and a real product—EVERLOCKS!
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Everlock

PROTECTED CARS FINISH 1-2-3 AT 1949 INDIANAPOLIS 500 MILE CLASSIC

•

The Washer That Has The Edge

The overwhelming favorite of top racing drivers since 1936, **Everlock Washers** again justifies the confidence of these experts in the 1949 Indianapolis 500 mile sweepstake.

For the tenth consecutive race — 1936 to 1949 — **Everlock** equipped cars finished 1-2-3. No wonder the drivers, who stake their reputation and life on the dependability and endurance of the cars they drive, insist on **Everlock Washers** for protection against the hazards of loose nuts, bolts or screws during the grueling 500 mile run.

The same exclusive qualities which make **Everlock Washers** the choice of champions on the speedways—*wide chisel edges combined with powerful spring tension*—are causing more and more leading manufacturers to standardize on **Everlocks** wherever lock washers are needed.

Test **Everlocks** on your own assemblies. See for yourself how their many distinctive advantages combine to reduce both production and service costs.

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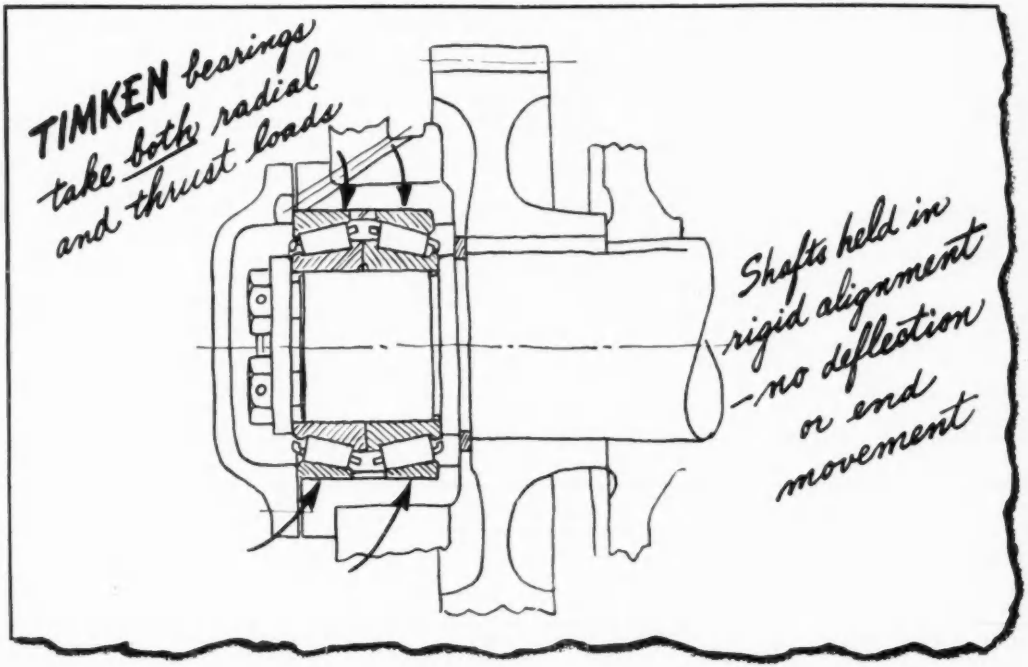


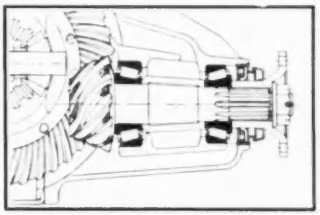
If you're working on a secret transmission, here's how to keep it quiet

NO matter how you may be planning to convert power, you can insure quiet operation in your transmission by mounting the shafts on Timken® tapered roller bearings.

Timken bearings hold shafts in rigid alignment. They eliminate deflection and end-movement—prevent wear on surrounding parts. Your transmission works more smoothly—more quietly.

You have greater simplicity, too. Higher load capacity lets you use smaller bearings and save on space. No special thrust bearings or washers are required. And because you can make precise and permanent adjustment at installation, Timken bearings permit wider tolerances of surrounding parts.

Incorporating Timken bearings into the design of your transmission now is a quick, simple, inexpensive way to help insure its success later.



THE TREND'S TO TIMKEN FOR THE TOUGHEST JOB OF ALL!

During the past year, two more car manufacturers have switched to Timken bearings on the pinion. So now, all but two cars depend on Timken bearings for the automotive industry's toughest bearing job.

Timken bearings have had an important place in automotive designs for 50 years.

They have carried the toughest loads, given trouble-free operation, and usually lasted the life of the car . . . in front wheels, rear wheels, pinions, differentials, steering parts, axles, and other important applications. For the latest technical bearing data, which may help you design Timken bearings into your newest transmission plans, call upon our engineering staff. In Detroit, phone TRinity 5-1380. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

NOTE TO P. A.'S. *Because every step of the manufacture of Timken bearings is controlled within our company...because our vast manufacturing facilities are widely dispersed... you will find The Timken Roller Bearing Company a supply source of outstanding reliability.*

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TIMKEN

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